SB369
.C58
41:3

Representative of Every Interest

The Citrus Industry

Representing No Special Interest

Comparison of Characteristics In Commercial Aqueous Extracts of Orange Pulp

Citrus Tree Movement Highest Ever

FFA of USA Will Visit California's Golden Gate In August

Citrus Fruit In Europe

The Long-Time Citrus Outlook

Plant Board Says Population Decreased Among Spreading Decline Groves

Winston Retires After 40 Years USDA Service

Single Copy ..... 15 Cents

Subscription
$1.00 Per Year In Continental U. S.
$2.50 Per Year Outside

CLEMSON COLLEGE LIBRARY
MAR 14 1960
AGRI. ECF. DEPT.

Bright Outlook

The present trend of business and the growth of Florida indicates that while this period may not be classed as a boom as was the case in 1924 and 1925, about the only difference lies in the fact that business during the present period is not operating on a shoestring as was the case in the earlier period.

Along with others in business in Florida citrus growers appear to be profiting by the present state of prosperity . . . the citrus crop has been bringing good, if not sensational prices . . . while land values, including citrus acreage, are bringing prices which surpass any in the minds of most growers.

Consequently the Florida citrus grower has the responsibility of taking the best possible care of his groves and acreage in order that he, too, may reap the greatest possible harvest from the present situation.

VOL. 41 — NO. 3 MARCH, 1960 BARTOW, FLORIDA

THE PERFECT POST-BLOOM COMBINATION
- - - TENNESSEE'S BIG THREE - - -

PROVEN SUPERIOR BY SUCCESSFUL CITRUS GROWERS

1. **TRI-BASIC COPPER** (Micronized) — The dependable fungicide for complete protection against fungus disease —
2. **TENNESSEE'S NU-Z** — The neutral zinc that gives perfect correction and prevention of Zinc deficiency —
3. **SPRAY NU-MANESE** — Gives positive control and prevention of Manganese deficiency —

. . . ALL THREE NEUTRAL MATERIALS —
RESIDUE ON LEAVES HELD TO A MINIMUM - - -

—Whether You Buy Nutritional Mixtures—or Straight Materials—for Your Post-Bloom Spray—Always Specify THESE TENNESSEE PRODUCTS—Your Assurance of Quality and Dependability—

TC TENNESSEE CORPORATION

TENNESSEE CORPORATION
615-29 Grant Building • Atlanta 3, Georgia

Plant Board Says Population Decreased Among Spreading Decline Groves

The following statement received from the office of the State Plant Board is self explanatory.

Possibly no one in citrus is more aware than the production man of the threat of spreading decline to the future of the industry. This awareness is based upon company files which offer complete histories of all citrus groves under a production manager's care.

Thus ,the health and vigor of any grove in an organization can be noted with a little study. And by putting the information on a chart, the productivity of a grove can be spotted in a glance.

That's exactly what Charles D. Kime, Jr., production manager for the Waverly Growers Cooperative has done with a half dozen groves infested with spreading decline. What the graphs show is enlightening and backs up forcibly what many growers have contended all along—that trees infested with the burrowing nematode responsible for spreading decline cannot hold their own with otherwise healthy trees.

Kime's pictorial record begins with the 1947-48 season when the six-grove average was 575 boxes of fruit per acre—well above average for trees of like ages and varieties. Production figures thereafter slip steadily, with an occasional gain attributed to weath conditions and to "good" bearing seasons.

By the 1949-50 season, the average number of boxes per acre had slipped to 229. The following year this had increased to 413 boxes, but the line gradually turned downward until it hit a low of 163 boxes in 1957-58. This state of affairs resulted in the sale and ultimate pushing and treating of one of the groves.

Oddly enough, the chart displayed an increase in production last year with 251 boxes per acre. This circumstance was created by an unexplained gain for the largest of the groves by way of offsetting continued losses for the remaining plantings. Nevertheless, one entire grove and all but one-third of another were pushed and treated at the end of the season.

The charts are of especial interest in view of the fact that Waverly has been an industry leader in the fight against spreading decline. Always progressive, this organization has left no stone unturned through the years in insuring top-quality and top-quantity production. When all efforts failed to rally ailing trees several years ago, Waverly removed the trees and treated the soil according to recommendations of the Citrus Experiment Station at Lake Alfred. Waverly constructed its own fumigation rig and this unit later was used by the State Plant Board when that state plant pest control agency entered the decline fight in 1955.

A look at the charts of the individual groves in the survey uncovers several interesting items.

For instance, the largest of the groves, a 20-acre planting of tangerines and early and late-season oranges, produced 670 boxes of fruit per acre in 1947-48 and dropped as low as 75 boxes 10 years later. This grove did rally last season, however, to account for 310 boxes per acre. Although the production trend was ever downward, the drop was not too sharp until a period of dry weather began in 1953-54 and continued for three years. This particular weather phenomenon can be traced through all the records used in the survey.

A 10-acre planting (figure 2) which first appeared on the chart with 590 boxes of mixed fruit varieties in 1947-48 began to decline slowly with discovery of the disease that year. The drop was not drastic in this instance, since an attempt was made early to remove the sick trees and to protect the remaining trees. By last year, the average had been reduced by two-thirds, although production figures had been steadied at 283 boxes per acre. This figure was more or less static, with no great change since the drought period began in 1953-54.

A nine-acre planting (figure 3) of Hamlin oranges, purchased by a Waverly grower as an investment, produced only 47 boxes per acre when placed under Kime's management in 1949-50. Kime was able to boost this pickout to 210 boxes in two years and reached a high of 226 boxes in 1954-55. The grove was not able to weather the effects of the drought, however, and slipped rapidly until production last year was 27 boxes. The owner decided then to have the property pushed and treated.

Little could be done to halt spreading decline in a five-acre grove shown on the charts. From a high of 639 boxes in 1948-49, this planting plummeted to last year's low of 186 boxes per acre.

Pushed out last year was a four-acre grove that produced as much as 528 boxes of fruit per acre in 1947-48. Here again, dry weather proved an ally of the burrowing nematode and the average yield by 1957-58 was 131 boxes.

The sixth grove, four acres of Valencia oranges, had a high mark of 348 boxes per acre in 1948-49 and climbed as high as 232 boxes in 1955-56 before spiraling into a four-year skid that left last season's pickout at 150 boxes.

To back up the story told by the graphs, Kime points out that the trees averaged between 25-30 years of age, had previous records as good producers, and had just begun to show symptoms of spreading decline in the 1947-48 season. He said the same care was given these trees as all others under Waverly management, and that only the decline-diseased trees registered any disturbing drop in production during the 11 years represented by the charts.

FOR RESULTS TRY ADVERTISING IN THE CITRUS INDUSTRY.

SOUTHERN DOLOMITE
PALMETTO, FLORIDA
PHONE: BRADENTON 2-1411

For fruit that's SUNSHINE BRIGHT...

Eliminate time-consuming sulfur applications in your post-bloom sprays...and get long-lasting protection against rust mites with DITHANE Z-78. This time-proved zineb protects your groves until summer scalicide is needed. DITHANE Z-78 has good persistence even in rainy weather... is easy and mild on tender growth... does not alter soil pH ... and gives you good control of russeting and greasy spot. See your dealer for DITHANE Z-78 now ... use it in your post-bloom or nutritional sprays.

Chemicals for Agriculture

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

DITHANE *is a trademark, Reg. U.S. Pat. Off. and in principal foreign countries.*

DITHANE Z-78

The Citrus Industry
EXCLUSIVE SPECIALIZED CITRUS PUBLICATION
Issued Monthly
Representative of every interest
Representing no special interest

Publication office at Bartow, Florida. Entered as second class matter February 16, 1920, at the post office at Tampa, Florida, under act of March 3, 1879. Entered as second class matter June 19, 1933, at the post office at Bartow, Florida, under act of March 3, 1879.

Comparison Of Characteristics In Commercial Aqueous Extracts Of Orange Pulp . . . *Produced From Midseason And Late Season Fruit*

1. Introduction and Some Characteristics in Aqueous Extracts of Orange Pulp[1]

R. L. HUGGART, R. W. OLSEN, F. W. WENZEL,
R. W. BARRON and G. H. EZELL
Florida Citrus Experiment Station, Lake Alfred

Procedures for the water extraction of fruit solids from orange pulp were incorporated during the 1957-58 citrus season as an additional process in the production of frozen orange concentrate by some commercial plants in Florida. This additional process was introduced primarily because of the extra yield of orange solids obtainable. Such an increase in yield of fruit solids, naturally, has always been important and of interest to management. It became of greater importance during the 1957-58 processing season because of the high cost of oranges which resulted from a short supply brought about by the severe freezes of that season. Also, the elimination of the second finisher in a double juice-finishing operation by the substitution of a "pulp washing" process was of interest to some companies as a possible means for improving the quality of frozen orange concentrate. A majority of the concentrate plants in Florida produced aqueous extracts of orange pulp by various pulp washing procedures during the 1958-59 citrus season and added such extracts to the evaporator feed juice during the production of orange concentrate.

Many questions were asked about equipment and procedures for the recovery of fruit solids from orange pulp, as well as the effect of pulp washing on yield of solids and on the quality of frozen orange concentrate. To obtain data on which to base answers to such questions, a study of the water extraction of orange solids from pulp was undertaken at the Citrus Experiment Station in April 1958. Results from this investigation have been discussed on several occasions (1, 3) and also published (2, 4).

The purpose of this series of four papers is to present and discuss data obtained from the examination of commercial samples of aqueous extracts of orange pulp which were collected during the 1958-59 season from some Florida plants. Characteristics of extracts of orange pulp produced from midseason and late season fruit are compared. These data make possible a comparison of these properties with those found in samples of orange juices obtained from the commercial plants at the same time. A discussion of the effect of some pulp washing procedures on these characteristics is also presented. Finally, some conclusions, based upon the results of this investigation, are given concerning the use of aqueous extracts of orange pulp in the production of frozen orange concentrate.

EXPERIMENTAL PROCEDURE

Collection of Commercial Samples. — Water extracts of orange pulp and samples of pulp, both before and after extraction, were collected from 9 plants during the period of January 28 to February 11, 1959, at which time some of the commercial midseason pack of frozen orange concentrate was being processed. Samples of orange juice also were taken in these plants immediately after the first juice-finishing operation. Although five plants were using centrifuges to remove water-insoluble solids from the very pulpy extracts, samples of extracts both before and

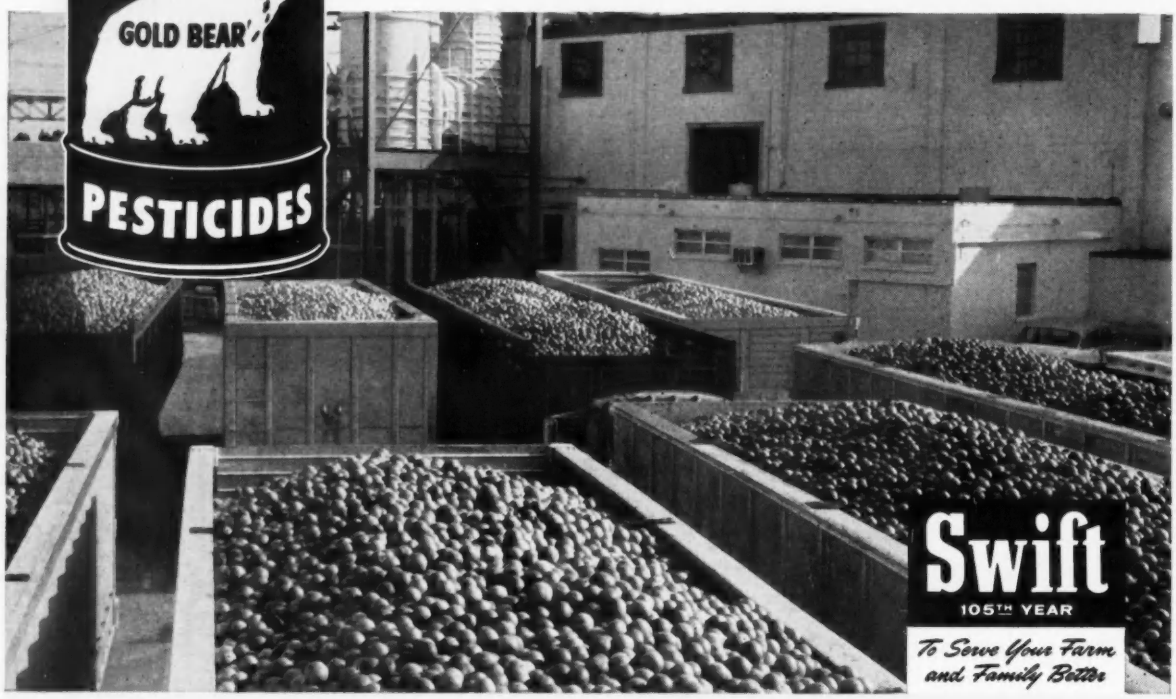
(Continued on page 7)

[1] Cooperative research by the Florida Citrus Commission and Florida Citrus Experiment Station.

Florida Agricultural Experiment Station Journal Series, No. 991.

Presented at 1959 Annual Meeting of Florida State Horticultural Society.

Swift's EXTRA MEASURE of Pesticide Quality...



PAYS OFF at the Market Place

What a beautiful sight when citrus moves to market. And right now you can help assure hundreds of extra harvest dollars by just investing a few in **Gold Bear** pesticides . . . insecticides and fungicides. That's why **Gold Bear** belongs in your market picture.

Why **Gold Bear?** Two reasons: First the ingredients—the finest of the old, and the tested of the new . . . all selected for quality, potency and life in storage.

Second—ever-watchful quality control of every ingredient and process to assure you of trouble-free, uniform application and higher killing power with either liquids or dusts.

Plan now to use Swift's **Gold Bear** products . . . ever on guard for your crop dollars. Then relax . . . and collect at the market place.

CONSULT ONE OF THESE REPRESENTATIVES

R. V. ALBRITTON
110 So. Pine St., Sebring
Ph. EVergreen 5-4551

L. D. ALDERMAN
Box 36, Wimauma
Ph. 47-4291 (Tampa)

W. P. BASS
2506 Center St., Orlando
Ph. 5-8081

P. J. DRISCOLL
Box 333, Clermont
Ph. EXeter 4-5401

J. M. FENNELL
Box 295, Tice
Ph. EDison 7-6681

J. W. GRAY, Jr.
676 Ave. F., S.E.
Winter Haven
Ph. CYpress 3-5413

C. C. HELMS
Box 922, Homestead
Perrine, Ph. CEdar 5-2920

P. L. HEPBURN
P. O. Box 537, Frostproof
Ph. 6563

H. L. JOHNSON, Jr.
220 E. Pearl St., Bartow
Ph. CApitol 3-6182

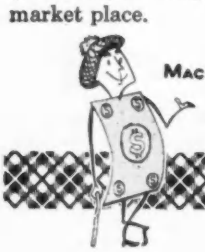
RICHARD S. PIKE
Box 124, Vero Beach
Ph. JOrdan 7-2375

P. M. SCHAILL
219 North Pine
Fort Meade
Ph. ATwater 4-4151

W. V. WEBB
3607 Corona St., Tampa
Ph. 66-0201

R. L. WILSON
243 S.E. 7th Ave.
Deerfield Beach
Ph. Boca Raton 5357

E. L. WOOD
Box 2123, Univ. Stat.
Gainesville
Ph. FRanklin 6-7064



Mac DOLLAR says:

WHEN YOU'RE FARMING TO MAKE MONEY, SWIFT'S YOUR FINEST BUY!

SWIFT & COMPANY • Agricultural Chemical Division • Winter Haven and Pompano Beach

Comparison of Characteristics In Commercial Aqueous Extracts of Orange Pulp Produced From Midseason And Late Season Fruit

(Continued from page 5)

after centrifugation were obtained from only three plants. When some of the late season pack of frozen orange concentrate was being processed during May 1959, similar samples of water extracts, pulps, and orange juices were obtained from the same concentrate plants.

All samples were filled in No. 1 plain tin cans at the plants, the cans closed, and the products immediately and rapidly frozen by immersion in a mixture of dry ice and isopropyl alcohol. During transportation to this Station the samples were kept frozen amined.

and then stored at -8°F. until ex-

Analytical Procedures. — After removal of the samples from storage at -8°F. and thawing, 35 samples of orange pulp, 23 water extracts, and 17 orange juices were examined for the 8 characteristics discussed in this paper. All Brix values were determined using a refractometer. Total acid, pH, and ascorbic acid in the aqueous extracts and orange juices were determined by conventional methods. The Brix/acid ratios were calculated. Relative viscosities of the centrifuged extracts and juices were measured at 26°C with an Ostwald pipette. The orange juices and the water extracts of orange pulp were also examined for color and flavor.

RESULTS AND DISCUSSION

Processes and Equipment Used in Commercial Plants. — When the commercial samples were obtained, information in considerable detail was furnished by all companies, except one, concerning the equipment and process being used for water extraction of orange pulp. Both paddle finishers, with either brushes or paddles, and screw finishers were used in the various pulp extraction processes with the number in a series ranging from 3 to 6; rotating screens were employed in two plants. Food Machinery In-Line juice extractors and Brown juice extractors were utilized in five and four of the plants, respectively. A brief description of the different pulp washing processes in use when the midseason and late season samples were obtained from the plants is given in Tables 1 and 2. Letter codes used in many of the tables in this series of four papers to indicate the different pulp extraction processes are also given in Tables 1 and 2.

In plants 1, 2, 3, 4, and 5 (Table 1) the pulp was discharged consecutively from each of a series of juice finishers and water was added to the pulp which entered the last finisher. Then the water extract was pumped successively from each of the finishers, in a countercurrent fashion, to the other finishers in the series; also, in plants 4 and 5 the water extract was recycled through several finishers. A countercurrent flow of water extract from sections of a rotating screen was employed in plant 6 as the pulp passed through the screen. The extraction process in plant 7 consisted of recycling the water extract through a double finishing process using a rotating screen and a juice finisher. Water was added between the first and second finishers of a double finishing operation in plant 8. In plants 3, 4, 5, and 9 centrifuges of various types were used to reduce the amount of pulp in the water extract prior to mixing with juice for evaporation. However, it was not possible to get a sample of extract after centrifugation from plant 5, whereas such samples were taken in the other three plants. In plant 2 the water extract and the juice were mixed and then centrifuged before evaporation. Therefore, the sample of pulp discharged from the centrifuge in this plant contained pulp from both the water extract and the evaporator feed juice. Also, it was not possible to obtain a sample of water extract after centrifugation from plant 2.

Some changes in the pulp washing

(Continued on page 9)

TABLE 1. Procedures used for water extraction of orange pulp in some commercial plants during processing of the 1958-59 midseason pack of frozen orange concentrate.

Plant number	Code used in tables[1]	Extraction process	Soluble solids — ° Brix: In pulp, Before extraction	In pulp, After extraction	In water extract
1	CF	Countercurrent flow through finishers	12.2	6.4	4.0
2	CF	Countercurrent flow through finishers; however, extract and juice mixed and then centrifuged before evaporation	9.6	3.4[2]	7.5[2]
3	CFC*	Countercurrent flow through finishers and extract centrifuged	10.6	2.4	4.9
4	CFRC*	Countercurrent flow through finishers, extracts recycled and final extract centrifuged	12.0	5.2	7.7
5	CFRC*	Countercurrent flow through finishers, extracts recycled and final extract centrifuged	10.2	3.6	7.5[4]
6	CS	Countercurrent flow through rotating screen	11.0	7.6	8.6
7	SFR	Rotating screen and finisher used in double juice finishing operation; water added after rotating screen and extract recycled	9.4	5.0	6.5
8	WDF	Water added after first finisher in double juice finishing operation	10.4	8.2	7.9
9	NOC*	Not observed, but extract centrifuged	10.8	4.0	7.7

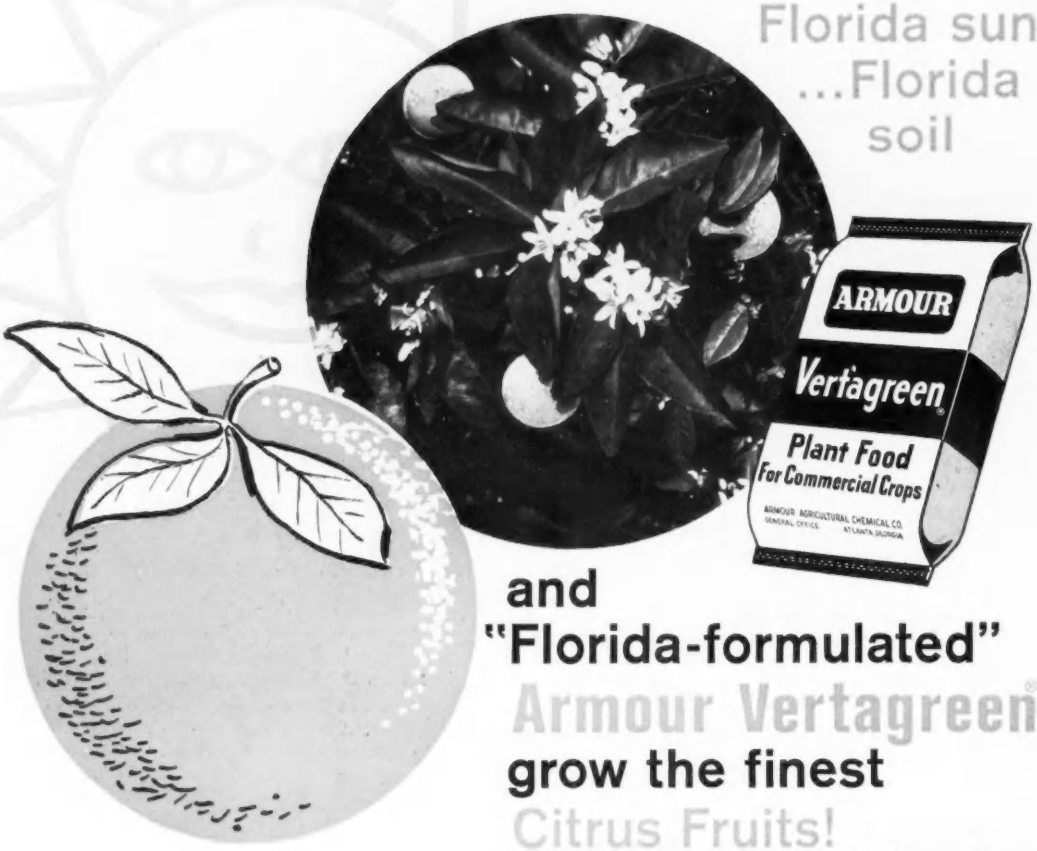
1 C = countercurrent flow of water and pulp; and C* = centrifuge used.
2 Soluble solids in pulp after centrifugation of mixture of extract and juice.
3 Sample of extract before it was mixed with juice for centrifugation.
4 Sample of extract before centrifugation.

Table 2. Procedures used for water extraction of orange pulp in some commercial plants during processing of the 1958-59 late season pack of frozen orange concentrate.

Plant number	Code used in tables[1]	Extraction process	Soluble solids — ° Brix: In pulp, Before extraction	In pulp, After extraction	In water extract
1	CF	Countercurrent flow through finishers	10.4	4.4	Footnote[2]
2	CFC*	Countercurrent flow through finishers and extract centrifuged	11.0	3.4	6.1
3	CFC*	Countercurrent flow through finishers and extract centrifuged	11.2	3.6	6.2
4	CFRC*	Countercurrent flow through finishers, extracts recycled and final extract centrifuged	11.0	3.6	7.2
5	CFR	Countercurrent flow through finishers and extract recycled	10.4	5.2	8.0
6	CS	Countercurrent flow through rotating screen	10.8	7.4	7.3
7	SFR	Rotating screen and finisher used in double juice finishing operation; water added after rotating screen and extract recycled	10.8	5.8	7.0
8	WDF	Water added after first finisher in double juice finishing operation	11.0	8.2	6.2
9	NO	Not observed	Footnote[2]	3.6	7.4

1 C = countercurrent flow of water and pulp; and C* = centrifuge used.
2 Sample not obtained

Florida sun
...Florida
soil



and
"Florida-formulated"
Armour Vertagreen®
grow the finest
Citrus Fruits!

Especially formulated for Florida Citrus Crops, Armour Fertilizers have an extra growth boost that gives you that extra yield of finer grade fruit . . . more profit per grove.

Remember, it isn't how little a fertilizer costs, but how much it does that counts. Be sure to try Armour Vertagreen, the complete plant food. You'll find it's worth more because it does more.

These Armour field representatives stand ready to give the finest in fertilizer quality and service.

Mr. R. E. Pinner
P. O. Box 561, Bartow, Florida
Phone: CA 3-9717

Mr. D. R. Kemper
P. O. Box 158, Clermont, Florida
Phone: EX 4-2513

Mr. W. S. Williams
435 North Kentucky, DeLand, Florida
Phone: RE 4-1316

Mr. M. F. Zellner
P. O. Box 7, Floral City, Florida
Phone: Park 6-2085

Mr. D. C. McCormick
P. O. Box 1549
Fort Myers Beach, Florida
Phone: MO 3-2046

Mr. J. T. Brantley
902 N. E. 15th Street
Homestead, Florida
Phone: CIrcle 7-6658

Mr. S. O. Owens
P. O. Box 3007
Jacksonville, Florida
Phone: RA 5-5491

Mr. L. L. Eaddy
P. O. Box 285
Lake City, Florida
Phone: 3206

Mr. O. H. Gotsch
P. O. Box 32
Lake Hamilton, Florida
Phone: HA 2-4822

Mr. L. W. Jones
P. O. Box 774
Lake Wales, Florida
Phone: 3-3124

Mr. J. B. Smith
P. O. Box 306
Newberry, Florida
Phone: GReenleaf 2-2356

Mr. W. W. Beckett
P. O. Box 7701
Orlando, Florida
Phone: GArden 3-9890

Mr. R. V. Barber
P. O. Box 6
Palmetto, Florida
Phone: 6-2503

Mr. G. C. Butler, Jr.
P. O. Box 3
Perrine, Florida
Phone: CE 5-4067

Mr. J. F. Cochran
P. O. Box 1121
Pompano Beach, Florida
Phone: WEbster 3-1660

Mr. H. W. Philpot
P. O. Box 413
Tallahassee, Florida
Phone: 3-2101

Mr. J. E. Scott
P. O. Box 1957
Vero Beach, Florida
Phone: JOrdan 7-2263

ARMOUR AGRICULTURAL CHEMICAL COMPANY
ATLANTA, GEORGIA

Comparison of Characteristics In Commercial Aqueous Extracts of Orange Pulp Produced From Midseason And Late Season Fruit

(Continued from page 7)

process had been made in three of the nine plants when the late season samples of orange juices, pulps, and water extracts were collected during the month of May. In plants 5 and 9 (Table 2) centrifuges were not being used and in one of these some changes had been made in the recycling procedures. The water extract was being centrifuged in plant 2, whereas previously the extract and juice were mixed and then centrifuged before evaporation. As indicated in Table 2, samples of water extract and of orange pulp were not obtained from plants 1 and 9, respectively.

Use of Pilot Plant Unit for Recovery of Fruit Solids from Orange Pulp. — The rapidity with which soluble solids may be extracted from orange pulp was demonstrated (4) with a pilot plant extraction unit. This unit consisted of pulp feeding equipment and a series of four small Chisholm-Ryder Sepro-sieve screw finishers equipped with 0.020 inch screens. When used pulp was fed into the first finisher and discharged from the fourth finisher; water was added to the fourth finisher and the extracts were then pumped successively back into each of the other three finishers with the final extract being discharged from the first finisher.

Juice from a Food Machinery In-Line extractor was passed through a screw finisher and the discharged pulp fed to the pulp extraction unit. Results showed that the Brix value of orange pulp was reduced from 11.7° to 3.1° when pulp was extracted as it passed through the four finishers. The extract increased from 1.6° to 7.2° Brix. The time required for the pulp to pass through the unit was approximately three minutes. The percentage of fruit solids recovered from the pulp also was shown (4) to increase as a larger number of finishers were used in the extraction process.

The effect of the water/pulp ratio used on the recovery of soluble solids was also determined. As this ratio was increased from 0.50 to 2.00, the percentage of soluble solids recovered increased from 51 to 81 per cent. In commercial operations it is desirable to keep this ratio as low as possible so as to avoid the evaporation of excessive amounts of water. Countercurrent flow of extract and pulp through processing equipment and recycling of extract are used to increase the soluble solids in the extract so that the water/pulp ratio may be maintained as low as possible.

Soluble Solids in Orange Pulp and Water Extracts. — Presented in Table 1 are the Brix values of pulps from midseason oranges, both before and after water extraction. The soluble solids in the pulp after extraction ranged from 2.4° to 8.2° Brix; these values show the relative efficiencies of the various extraction processes for the recovery of soluble solids from the pulp. Two of the lower Brix values were found in the discharged pulps from plants 2 and 3 where the process consisted of a countercurrent flow through a series of finishers; the third lower value was in pulp from plant 5 where, in addition to this process, recycling of the extract was used. Centrifuges were also employed in these three plants. Data are given in Table 2 for pulps from late season oranges and show a range from 3.4° to 8.2° Brix in these pulps after extraction. Three of the lower Brix values were found in the discharged pulps from plants 2, 3, and 4 where the process consisted as previously of a countercurrent flow through a series of finishers and the use of a centrifuge; also, in plant 4 the extract was recycled. The highest Brix value was in the extracted pulp from plant 8, where water was added after the first finisher in a double finishing operation; this was the same as when pulps from midseason oranges were extracted as shown by data in Table 1.

The Brix values of the midseason water extracts, as shown in Table 1, ranged from 4.0° to 8.5°. However, 6 of the 9 samples were in the range of 6.5° to 7.9° Brix indicating the desirability of obtaining as much soluble solids as possible in the water extracts, so as to eliminate the necessity of evaporation of excessive amounts of water. Processes used in plants 2, 5, and 9 resulted in the desirable combination of a high Brix value in the extract and a low Brix value in the extracted pulp. The late season water extracts of orange pulp had Brix values which ranged from 6.1° to 8.0°, as indicated in Table 2, and a high Brix value in the extract together with a low value in the extracted pulp were found in samples from plants 2, 3, 4, and 9.

Chemical and Physical Characteristics of Water Extracts of Orange Pulp. — Results reported in the tables in this series of papers show various characteristics of water extracts of orange pulp, and wherever possible, analytical values have been calculated to a 12° Brix basis for com-

(Continued on page 11)

Table 3. Some characteristics of water extracts of orange pulp obtained from nine commercial plants during the processing of the 1958-59 midseason and late season packs of frozen orange concentrate.

Plant Number	Pulp extraction process		Brix value		Acid as citric %				Ascorbic acid mg/100 ml			
					Initial		12° Brix basis		Initial		12° Brix basis	
	Mid	Late	Mid	Late	Mid	Late	Mid	Late	Mid	Late	Mid	Late
1	CF	-	4.0	-	0.36	-	1.08	-	19	-	59	-
2	CF	CFC*	7.5	6.1	0.48	0.32	0.77	0.63	35	21	57	42
3	CFC*	CFC*	4.9	6.2	0.32	0.38	0.78	0.74	23	21	58	42
4	CFRC*	CFRC*	7.7	7.2	0.48	0.45	0.75	0.75	37	22	59	37
5	CFRC*	CFR	7.5	8.0	0.56	0.47	0.90	0.71	32	25	52	38
6	CS	CS	8.6	7.3	0.56	0.39	0.78	0.64	34	27	48	44
7	SFR	SFR	6.5	7.0	0.40	0.38	0.74	0.65	32	23	61	40
8	WDF	WDF	7.9	6.2	0.54	0.37	0.82	0.71	37	23	57	46
9	NOC*	NO	7.7	7.4	0.47	0.41	0.73	0.67	34	21	53	35
	Minimum		4.0	6.1	0.32	0.32	0.73	0.63	19	21	48	35
	Maximum		8.6	8.0	0.56	0.47	1.08	0.75	37	27	61	46

Table 4. Some characteristics of water extracts of orange pulp obtained from nine commercial plants during the processing of the 1958-59 midseason and late season packs of frozen orange concentrate.

Plant number	Pulp extraction process		Brix/acid ratio		pH		Relative viscosity[1]	
	Mid	Late	Mid	Late	Mid	Late	Mid	Late
1	CF	-	11.1	-	3.6	-	2.58	-
2	CF	CFC*	15.6	19.0	4.1	4.0	4.39	4.97
3	CFC*	CFC*	15.3	16.3	4.0	3.6	2.16	2.18
4	CFRC*	CFRC*	16.0	16.0	4.0	3.9	13.78	5.55
5	CFRC*	CFR	13.4	17.0	3.9	3.8	23.90	30.40
6	CS	CS	15.4	18.7	3.9	4.0	23.00	1.68
7	SFR	SFR	16.3	18.4	4.0	3.9	18.33	4.00
8	WDF	WDF	14.6	16.8	4.0	3.9	2.98	3.34
9	NOC*	NO	16.4	18.0	3.9	3.6	3.99	2.00
	Minimum		11.1	16.0	3.6	3.6	2.16	1.68
	Maximum		16.4	19.0	4.1	4.0	23.90	30.40

1 Relative viscosity of centrifuged extract determined at 26°C using an Ostwald pipette.

ORTHO® ALMANAC FOR FLORIDA GROWERS

ORTHO Florida Citrus Spray Program: how and when to treat your crops for better yields

March is the time to...

Spray with ORTHOCIDE 50 Wettable. Applied from two-thirds petal fall until fruit reaches ½-inch in diameter, ORTHOCIDE 50 Wettable will give increased fruit set and yields. There are practically no compatibility worries – it can be added to almost any of the insecticides and fungicides commonly used in the post bloom spray with the exception of highly basic materials.

Use ORTHO Spray Sticker with wettable powders. This highly adhesive liquid sticker is specially designed to increase resistance of deposits to washing off by rain. A post bloom spray combination of ORTHOCIDE 50 Wettable and ORTHO Spray Sticker has provided melanose control equal to basic copper.

Control mites and scale with ORTHO formulations. For effective control of rust mites, spray with ORTHO Zineb 65; for scale, use ORTHO Parathion 8 Flow Concentrate. For other mite problems, apply ORTHO Trithion for bearing citrus, or ORTHO Tedion, which is now approved for use on *bearing* as well as non-bearing trees. It can be used once during the season while fruit is on the tree. This exceptionally good insecticide gives long-lasting control on oranges, grapefruit, tangerines, tangelos, limes and citrus citron.

ORTHO®

Helping the World Grow Better

For the ORTHO Citrus Spray Program best suited to your special needs, call your nearest ORTHO Fieldman!

California Spray-Chemical Corp. A subsidiary of California Chemical Co., P.O. Box 7067, Orlando, Florida

ON ALL CHEMICALS, READ DIRECTIONS AND CAUTIONS BEFORE USE. • TRITHION IS REG. T. M. OF STAUFFER CHEMICAL CO. T.M.'S REG. U.S. PAT. OFF.: ORTHO, ORTHOCIDE

Meet your ORTHO team...

CLIFF SUTTON

Manager of North Florida Branch of Calspray located in Orlando. Received his B. S. degree in agriculture from University of Florida. Call Cliff at Winter Garden Branch Office, OL 6-2626.

CHARLES ASHLEY

Received his B. S. in entomology from Auburn. Worked three years citrus spraying and two years as a laboratory assistant before joining Calspray. Resides in Leesburg, phone ST 7-2063.

WEBSTER CARSON

Joined Calspray in 1956 after receiving his B. S. degree in agriculture from University of Florida. Resides in Plant City—contact him by calling 3-8351.

JEAN MABRY

Served as an entomologist for two years with the U. S. Army before joining Calspray in 1955. Received his degree in agriculture from U. of Florida. Jean resides in Lakeland. Call MU 6-4515.

J. S. MURPHY

Received his degree in agriculture from University of Florida. Before joining Calspray in 1955, worked at Citrus Experiment Station. Resides in Lake Alfred, phone FR 2-1422.

JOHN NOWELL

Received his B. S. degree in agriculture from University of Florida. Joined Calspray in 1955. John lives in Orlando. Reach him at GArden 4-6754.

RANDALL WILLIAMS

Randy sold livestock and poultry feeds before joining Calspray in 1957. Received his degree in agriculture from University of Florida. Resides in Deland. Reach him by calling RE 4-0599.

Comparison of Characteristics In Commercial Aqueous Extracts of Orange Pulp Produced From Midseason And Late Season Fruit

(Continued from page 9)

parison purposes; minimum and maximum values are also indicated. Data obtained from the examination of the orange juice samples are also listed. A comparison of these values with those of the water extracts, calculated to 12° Brix basis, shows the relative amounts of substances, such as ascorbic acid and others, in these products. If the quantity of any substance is shown to be greater in the 12° Brix extract than that in a 12° Brix orange juice, then the amount of this substance in orange concentrate made from juice and extract will be slightly greater than that in concentrate made only from the juice.

A comparison of some characteristics in the aqueous extracts of orange pulp from midseason and late season fruit may be made by considering the data given in Tables 3 and 4. It should be mentioned that the Brix values, total acid, Brix/acid ratio, and pH of citrus juices are chiefly dependent upon the maturity of the fruit and ascorbic acid content varies in different citrus varieties. On a 12° Brix basis, the acid in the late season water extracts was about the same or slightly lower than that found in the midseason extracts and this resulted in a greater Brix/acid ratio in most of the late season extracts; however, the pH was slightly lower in the late season extracts than that in the midseason samples. As expected, the ascorbic acid was lower in the late season extracts than in those produced when midseason fruit was used. The relative viscosity of 4 midseason water extracts ranged from 13.78 to 23.90 and that of the other five samples were in a range of 2.16 to 4.39. Only one of the late season extracts had a very high viscosity of 30.40 while the other seven samples fell within the range of 1.68 to 5.55.

Variations in the extraction procedures in the different plants, as described in Tables 1 and 2, are believed to have little effect upon characteristics of the aqueous extracts, such as total acid and ascorbic acid, providing comparisons are made on a 12° Brix basis. However, variations in the water/pulp ratio used by different plants resulted in a wide range of initial values in the extracts for such characteristics as total acid, Brix values and others. From data shown in Table 4, it is apparent that the extracts having the very high relative viscosities were obtained from plants using recycling procedures.

(Continued on page 13)

Table 5. Effect of centrifugation for removal of pulp on some characteristics of water extracts of orange pulp during the processing of the 1958-59 midseason and late season packs of frozen orange concentrate.

Characteristics	Season	Plant No. 2 CFC*		Plant No. 3 CFC*		Plant No. 4 CFRC*		Plant No. 9 NOC*	
		Values before and after centrifugation							
		Before	After	Before	After	Before	After	Before	After
Brix value	Mid	-	-	5.2°	4.9°	9.0°	7.7°	7.8°	-
	Late	6.2	6.1	6.2	6.2	7.0	7.2	-	7.7°
Acid as citric — %	Mid	-	-	0.35	0.32	0.57	0.48	0.47	0.47
	Late	0.34	0.32	0.38	0.39	0.45	0.45	-	-
Brix/acid ratio	Mid	-	-	14.9	15.3	15.8	16.0	16.6	16.4
	Late	18.2	19.1	16.3	16.3	15.6	16.0	-	-
pH	Mid	-	-	3.9	4.0	3.9	4.0	3.9	3.9
	Late	3.9	4.0	3.6	3.6	3.9	3.9	-	-
Ascorbic acid — mg/100 ml	Mid	-	-	24	23	41	37	35	34
	Late	22	21	20	21	22	22	-	-
Relative viscosity[1]	Mid	-	-	2.23	2.16	3.25	13.78	4.26	3.99
	Late	3.92	4.97	2.10	2.18	3.62	5.55	-	-
Objectionable off-flavor	Mid	-	-	No	No	Yes	Yes	No	Yes
	Late	No	No	No	No	No	No	-	-

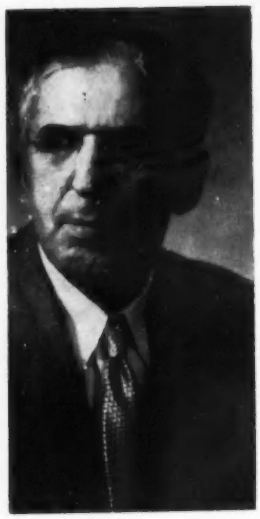
1 Relative viscosity of centrifuged extract determined at 26°C using an Ostwald pipette.

Table 6. Minimum and maximum values for some characteristics in commercial samples of orange juices and water extracts of orange pulp produced from midseason and late season fruit.

Characteristics	Water extracts of orange pulp				Orange juices			
	Midseason		Late season		Midseason		Late season	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Brix value	4.0°	8.6°	6.1°	8.0°	11.2°	13.6°	10.7°	12.4°
Acid as citric - %	0.32 (0.73)[1]	0.56 (1.08)[1]	0.32 (0.63)[1]	0.47 (0.75)[1]	0.83	1.13	0.69	0.90
Brix/acid ratio	11.1	16.4	16.0	19.0	11.5	15.1	13.1	15.5
Ascorbic acid - mg/100 ml	19 (48)[1]	37 (61)[1]	21 (35)[1]	27 (46)[1]	49	67	35	46
pH	3.6	4.1	3.6	4.0	3.7	3.9	3.4	3.8
Relative vicosity[2]	2.16	23.90	1.68	30.40	1.73	2.62	1.45	2.23

1 Values in parentheses calculated to 12° Brix basis for comparison purposes.
2 Relative viscosity of centrifuged extract or juice determined at 26°C using an Ostwald pipette.

The Long-Time Citrus Outlook[1]



By H. G. HAMILTON

Fortunate for me the program committee, in assigning this topic, did not tie me down to a fixed future date. While it is more difficult to make a long-time forecast than one near at hand, it has an advantage in that 10 to 20 years from now some people will have forgotten all about it; others will be deceased — even the speaker may not be around to be reminded of how far off he was.

I do not know how to go about judging the future except in the light of what we know about the past and present. We are going to make some assumptions — these are pure assumptions and on the basis of these assumptions, we will make certain observations about what the future may hold for the citrus growers of Florida.

First of all, we make the observation that supply and demand establish the price of a commodity. In the United States — in the long-run — supply tends to adjust to demand. Commodities, of course, compete with one another for a place in the consumer's basket. Furthermore, the cost of producing these commodities — in terms of labor, land and capital resource — will determine how well the various commodities can compete for a place in the consumer's basket. Without being technical and in layman's language, we simply state that when the demand for a commodity increases, the supply of that commodity usually moves up to meet the demand at about (not exactly) the same price it had before the demand increased.

Under the assumption that supply adjusts to demand in the longrun without much change in price, the important thing is to determine what the **demand** or the **market** for Florida citrus will be in 1970 or 1980, or at any other time which you chose. In the case of citrus fruit this deals in the realm of extrapolation. Extrapolate is a good word — it actually means shooting at the sun. It is going beyond an area in which you have had experience. It is making an attempt to determine what the situation would be for which you have no data beyond a certain point. Extrapolation would be used if you attempted to determine the effect that 10 tons of fertilizer per acre would have on citrus yield when you have no experiment that has used more than 4 tons of fertilizer per acre.

[1] Given at the 26th Annual Citrus Growers' Institute, Camp McQuarrie, August 13, 1959.

Oranges

In the six seasons, 1952-53 to 1957-58, most of the variations in the price of oranges are accounted for by three factors (or some other factor or factors that varied with these factors). These factors are: (1) the per capita supply of Florida and Texas oranges; (2) the per capita supply of Arizona and California oranges; and (3) per capita disposable incomes of individuals. This analysis bundles in three packages a number of things affecting the price of oranges—population, level of incomes, demand, production in Florida and production in competing areas.

Population. Population growth will probably increase the market for oranges in the future more than any other one thing. From 1947 to 1958, population increased at the rate of 2,750,000 per year or 1.7 per cent. It is now increasing in excess of 3,000,000 per year. You have no doubt seen many estimates of population for 1970, 1980, and for other years. I am using the estimates of the Bureau of the U. S. Census. The Bureau of the Census has made estimates of the population under four assumptions: (1) most favorable condition for population growth; (2) favorable conditions; (3) less favorable conditions; and (4) least favorable conditions.

You will note that there is a wide variation in the estimates. Perhaps the actual population will be somewhere between the extremes.

It is believed that California and Arizona orange production will level off at around 40,000,000 boxes (in making this forecast it should be remembered that orange production for these two states has ranged from about 24,000,000 boxes in the 1957-58 season, to about 62,000 000 boxes in the 1944-45 season). Actually the trend is slightly downward — the production this year is estimated at about 40,000,000 boxes. If it is also assumed that: there is no change in real per capita income; no change in the trend of real per capita demand for oranges (i.e., no change in the trend of demand when **income factors** are held constant); other factors such as Cinderella and "wicked witches" are not changed, and that population will be as follows (Table 1): then the market would take the following number of boxes of Florida oranges at a price of around $1.60 to $1.70 per box:

The chances are that the population will be neither as low or high as the extremes indicated in Figure 1 Perhaps the best bet is around 210,000,000 in 1970 and 250,000,000 in 1980. Under these population estimates the market would take around 114,000,000 boxes of Florida oranges in 1970-71, and 137,000,000 boxes in 1980-81 with prices remaining at around $1.60 to $1.70 per box. Should growers decide that they could produce oranges at $1.00 per box (which they certainly can) the market would be expected to take around 30,000,000 boxes fore oranges in 1970-71, and around 50,000,000 boxes more in 1980-81. This would mean a total of 144,000,000 and 187,000,000 boxes respectively.

Per Capita Income. For the six seasons, 1952-53 to 1957-58, a change in the real per capita disposable income of $100 caused a direct change of 20 to 25 cents per box in the on

Table 1. Assumed population and market supply of Florida oranges with prices at from $1.60 to $1.70 per box on the tree.

Season	Assumed Population	Market for Florida Oranges at $1.60 to $1.70 per box Boxes
1970-71	219,500,000	118,000,000
1970-71	202,500,000	108,000,000
1980-81	272,600,000	151,000,000
1980-81	230,800,000	125,000,000

tree price of Florida oranges. From 1947 to 1958, per capita disposable real incomes increased at the rate of $35 per year or 2.5 percent per year. It is not believed that real income will increase at this rate over the next 10 to 20 years. It is more likely that the per capita income will be like that illustrated by the line marked "profitable trend." Furthermore, we have no assurances that an increase of $100 in per capita income in the future would affect the price of oranges by 20 to 25 cents per box. Because of the relatively high per capita consumption of oranges at the present time, it is reasonable to believe that an increase of $100 in the per capita income when per capita income is around $2,000 would have less effect on the price of oranges than it has had in the past when the per capita income has been from $1,200 to $1,500. The demand of some commodities is believed to fall when incomes increase — for example, rice, grits, or potatoes. However, oranges should not be considered in this category. Since high-income people now consume more oranges than people with low incomes, we should expect that increasing the incomes of those people in the low income brackets would increase the market for oranges. How much no one knows, perhaps at one-half the rate of 1952-53 to 1957-58. Should incomes, by 1970, reach only $1,800 (1947-49 dollars) and this affected prices only one-half as much as incomes affected prices from 1952-53 to 1957-58, the market for Florida oranges would be increased by about 25,000,000 boxes.

Trend in Demand. In addition to changes in per capita income affecting the market for oranges, the market may be affected by: (1) creating a new product; (2) improving the quality of the product; (3) improving the quality of the marketing service; (4) by decreasing or increasing the demand for competing products; or (5) by advertising or various other kinds of promotional schemes. A change in the demand for oranges, brought about by one or more of the following ways, can be illustrated by the hypothetical demand curves given in Figures 3 and 4. In Figure 3, is the demand curve before the demand is increased. In Figure 4, is the demand curve (solid line) before the increase in demand and the demand curve (broken line) representing the situation after the demand has increased.

On the basis of what relevant information we can obtain, it appears that there has been no change in the real demand for oranges in the twelve season period, 1946-47 to 1957-58 if the effect of income is excluded. If orange prices for the period 1946-47 to 1951-52 inclusive are converted to 1947-49 dollars, and adjustments are made for: changes in the per capita supply of Florida and Texas oranges; changes in the per capita supply of Arizona and California oranges; and changes in the per capita income, the price of Florida oranges for the six seasons average $1.41 per box on the tree. In like manner, if adjustments are made for the six seasons, 1952-53 to 1957-58, the on-tree price of Florida oranges average $1.42 per box. This indicates that except for the influence of per capita income, there has been no change in the trend of per capita demand for Florida oranges. It does not say that there will not or cannot be a change in the trend, but I do not find anything that would lead me to believe that there will — in the future — be a change in the per capita demand for Florida oranges other than that which is reflected by increases in per capita incomes.

Efficiency in Marketing. We are doing a better job of marketing today than we have done in the past. Any improvement that we can make in the future in marketing will increase the market for oranges. Marketing margins for oranges from January to March 1959 were estimated at 40.5 cents per dozen. This is what was

Comparison of Characteristics In Commercial Aqueous Extracts of Orange Pulp Produced From Midseason And Late Season Fruit

(Continued from page 11)

Such procedures resulted in extraction from the orange pulp of larger amounts of water-soluble pectin, as shown in Table 3 of Part II in this series of papers, than that extracted from pulp in the plants where the extracts were not recycled; also in plants 4, 6, and 7 more water-soluble pectin was extracted from the pulp of midseason oranges than from pulp when late season fruit was used.

Data presented in Table 5 indicate that the use of centrifuges in four plants to remove pulp and water-insoluble solids from water extracts of orange pulp had little effect upon the Brix value, acid, pH, or ascorbic acid in these products. The causes of the large increase in the relative viscosity of the extract from plant 4 after centrifugation and the presence of an objectionable off-flavor in this sample will be discussed later.

Comparison of data in Table 6 for water extracts of orange pulp with that for the orange juices shows that the percentage of acid was less in the extracts than in the juices, which generally resulted in higher values for both Brix/acid ratio and pH in the extracts. Only slight differences in ascorbic acid were found between the juices and the extracts on a 12° Brix basis and the amounts of ascorbic acid in both the extracts and juices were in the same range of 35 to 46 mg/100 ml when late season fruit was used. The relative viscosity of the water extracts, except 5 having high values, was in the range of 1.68 to 5.55 as compared to the range of 1.45 to 2.62 for the centrifuged orange juices from both midseason and late season fruit.

Color and Flavor in Water Extracts of Orange Pulp. — All of the water extracts had a slight milky appearance and a slight yellow or greenish-yellow color. Extracts which had been recycled during the extraction process were poorer in appearance and color.

Very little orange aroma and flavor were detectable in any of the aqueous extracts of orange pulp. A peel aroma of moderate intensity was evident in all samples, similar to that often noticed in commercial extracted orange juice; this type of aroma is removed when juice is concentrated. Some astringency, varying in intensity from slight to moderate, was found in all of the extracts and slight bitterness was noticed in only one of the midseason extracts. Objectionable off-flavors were found in three of the midseason extracts as indicated in Table 1 in Part III of this series of papers.

LITERATURE CITED

1. Huggart, R. L., R. W. Olsen, and F. W. Wenzel. The problem of recovering fruit solids from orange pulp. Citrus Station Mimeo Report 59-2. Presented at the Ninth Annual Citrus Processors' Meeting, Lake Alfred, Florida, October 2, 1958.

2. Olsen, R. W., F. W. Wenzel, and R. L. Huggart. 1958. Recovery of fruit solids from orange pulp. Proc. Florida State Hort. Soc. 71: 266-274. Also, Citrus Magazine 21: (4) 8-10, 16-18.

3. Olsen, R. W., R. L. Huggart, and F. W. Wenzel. Examination of commercial water extracts of orange pulp produced during processing of late season fruit. Citrus Station Mimeo Report 60-5. Presented at the Tenth Annual Citrus Processors' Meeting, Lake Alfred, Florida, September 16, 1959.

4. Wenzel, F. W., R. L. Huggart, and R. W. Olsen. Water extraction of fruit solids from orange pulp. Transactions of the 1959 Citrus Engineering Conference, Florida Section of American Society of Mechanical Engineers. Volume 5.

taken in getting a dozen oranges off the tree, packed, transported, and sold. It included all the charges from tree to consumer. If this cost could be cut by one-fourth it would provide income to growers of about $1.50 per box more than they got during this period. Or if, in the future, cost of marketing could be reduced by 25 percent and supply-price relationships in the future were the same as that which was experienced from 1952-53 to 1957-58, it would provide a market for one-fourth to one-third more oranges without lowering the price of oranges to growers. Because of a number of reasons we are not likely to lower the cost of marketing. Labor is high, and promises to continue high, we are a great distance from market which makes expensive transportation necessary, and consumers are insisting on more built-in maid service. We should not now count on lowering the cost of marketing in the future as being a likely way of increasing the market for oranges.

On the demand side — we have an increase in population — and increase in per capita income which are favorable. Real demand is not likely to increase and costs are not likely to be lowered.

Supply of Oranges. In the beginning, we indicated that we have sufficient resources for the supply of oranges to adjust to any increase in demand. This, we believe, will be the case. However, we might project the trend in supply of Florida oranges and the supply of California oranges in order to see what we would have in 1970 and 1980 should increases continue at the rate they have in the past. Florida oranges, from 1935 to 1957, increased at the rate of 3,483,000 boxes per year (Fig. 5). This was an average rate of 6.5 percent per year. Should this rate continue in the future, in 1970 we would have 130,000,000 boxes and in 1980 — 170,000,000 boxes. But high prices are stimulating increased planting, fertilization and grove care to an extent that production may increase faster than indicated by the past trend.

The trend in the production of California oranges is given in Figure 6. The increase from 1934-35 season to 1957-58 season was minus 360,000 boxes per year or 0.85 percent.

California production of oranges is expected to level off at around 35 to 45 million boxes, rather than follow the projected trend. This means that the orange market will have to look largely to Florida for the increase in supplies. There is no question in my mind but that Florida orange supplies will be forthcoming in quantities sufficient to supply the most favorable condition expected, and at prices within the range of prices for the last 10 years. The supply of Florida oranges will certainly be influenced by the size of the market. Under the most favorable conditions of population growth and per capital income, the supply of oranges will be much greater than they would be should population growth and incomes be that of the least favorable forecast. The facts are that the size of the orange market will generate its own orange supply. I came to Florida in 1916 and at that time, people were saying that most good citrus land had been planted. Since that time, the acreage has been increased 5 or 6 times. The year before the freeze we planted more oranges than any other time in the past. In the four season period 1953-54 to 1956-57 we planted about twice as many oranges as for any other 4-season period of the past. It would be conducive to a more healthy growth of the citrus industry if people would get out of their minds that we are going to run out of citrus land. Growers today seem to be in a mad rush to plant every additional acre that they can put their hands on as though this acre will be the last acre that is ever planted to oranges. Our assumption today about population growth, per capita income, trend in demand and California production may all be wrong, but the assumption that we will not run out of citrus land will not be wrong. Land values may rise but we shall always have land for citrus. So I say to you, get it out of your heads that we are going to run out of citrus land and we will do a better job of increasing the supply of citrus in line with the market.

Grapefruit

It is not necessary to go through the details for grapefruit. Growth in population and per capita income are factors affecting the price of grapefruit. An expanding population and an increase in per capita income will be factors increasing the size of the grapefruit market.

Trend in Demand. The demand for grapefruit is definitely decreasing. The Florida and Texas supply of grapefruit averaged 23 pounds per capita from 1946-47 to 51-52, and only 18.3 pounds per capita from 1952-53 to 1957-58. In the first period, prices averaged 81 cents per box on the tree and in the second period, only 72 cents per box. Thus, 20 percent less per capita supply brought 11 percent lower prices. If the prices are adjusted for inflation, the price in the first period would have been 78 cents per box, and the latter period 63 cents per box, or 20 percent less. In the six-season period 1935-36 to 1940-41, inclusive, the per capita supply of grapefruit was the same as it averaged for the last six seasons but the price in terms of 1947-49 dollars was 96 cents per box as compared to 63 cents in the six-seasons 1952-53 to 1957-58. This represents a marked decline in the demand for grapefruit. Should this decline continue, it would offset, to a considerable extent, the increase in population and per capita income of the future. There will be, however, an adjustment in the division of resources in the future that will enable grapefruit production to be as profitable as orange production.

Before closing, I want to make a few observations about prices and cost.

Low Prices. Lower prices will be followed by decreased plantings, low fertilization, decrease in care of groves and decrease in grove values.

High Prices. Higher prices will stimulate planting, cause increase in fertilization, better care of groves and increase in grove values.

Cost Decreasing. When costs of production or marketing are reduced and prices to consumer remain the same, increase in plantings and better care of groves will take place. Profits will increase and grove values will increase.

Cost Increasing. When costs of production or marketing is increased with no change in demand, planting will decrease, fertilization and grove care will decrease. Profits will decrease and grove values fall.

Foreign Markets. The outlook for a great foreign market is not promising unless some other product, like orange powder, is perfected.

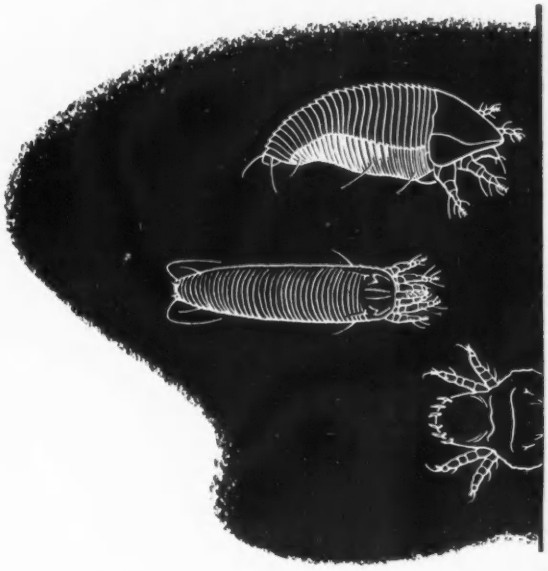
Grove Values. At present prices groves are valued very moderately. However, at prospective prices and cost groves may be over valued.

In the future, the Florida citrus industry may want to consider seriously how it might organize itself to deal more effectively with new conditions that have arisen over the past few years. Largely because of technological progress, a new marketing situation has come into being. I shall not take the time to discuss how technological development is responsible for this situation. But the situation is this. At the present time, 84 percent of the consumer's food dollar is spent either with the corporate chain or the so-called co-op food stores. Only 12 years ago, this group of stores had only 66 percent of the business and not many years ago they had less than half of the business.

(Continued on page 28)

Florida Citrus Growers

Stop mites



safely

effectively

economically

with

CHLOROBENZILATE

miticide

- long residual action
- low cost protection
- controls phosphate resistant strains
- effective against all growth stages of mites
- safety to man and animals — to bees under normal field conditions
- non-irritating to skin

Order now from your supplier.

Grapefruit, Oranges, Tangerines: Rust Mite; Flat Mite; Six-Spotted Mite; Texas Citrus Mite; Citrus Red Mite (Purple Mite).
Lemons: Bud Mite; Rust Mite.

Geigy *ORIGINATORS OF DDT INSECTICIDES*

GEIGY AGRICULTURAL CHEMICALS • *Division of Geigy Chemical Corporation* • Saw Mill River Road, Ardsley, N.Y.

Citrus Tree Movement Highest Ever

By ZACH SAVAGE

Agricultural Economist
Agricultural Experiment Stations

Movement of citrus trees from Florida nurseries to Florida destinations was the highest since the beginning of these records during the period of July 1, 1958 to June 30, 1959. The movement was 241 percent of last season and 184 percent of the 5-year average of 1950-55. The movement in 1958-59 was 2,617,221 trees. See accompanying table. This movement was 235 percent of the 1928-58 average.

Citrus tree movement was reported by Florida nurserymen to the Nursery Inspector of the Florida State Plant Board, Gainesville, by mailing copies of invoices when shipping trees to their destinations. Personnel of the Department of Agricultural Economics, Florida Agricultural Experiment Stations, Gainesville, assembled these data for Florida destinations over the 31-year period from the invoices in the files of the Florida State Plant Board. Copies of the latest report as Agricultural Economics Mimeo Report 60-7 are available from this Department which show movement of trees by kinds and seasons for 31 years, together with the 1958-59 movement by variety and county oy destination. Included also is the percentage distribution by kind of rootstock and scion variety for the 1958-59 season.

Sixty-five percent of the total movement during the 31 seasons was in the 15 seasons when in excess of a million trees were moved each season. Forty-eight percent of the movement was during the past 10 seasons of 1949-59. The average annual movement during the 31 seasons of 1928-59 was 1,111,046 trees.

Using an average of 65 trees set per acre, there were enough trees moved during the 31 seasons to set 529,884 acres. Seasons varied from an equivalent acreage of 8,119 in 1934-35 to 40,234 in 1958-59. The average was 17,093 equivalent acres annually.

Eighty-six percent of the 1958-59 movement was orange trees — Temple included — as compared to 74 percent for the 31 seasons of 1928-59 and 72 percent for the 5-year average of 1950-55. Grapefruit trees made up 4 percent of the 1958-59 movement, 15 percent for average and 15 percent for the 1950-55 period. Orange, grapefruit, and tangerines constituted 91 percent of the total movement in 1958-59, 90 percent for average, and 88 percent during 1950-55. The remaining trees were lime, lemon, tangelo, and other citrus.

Orange Trees.

Late orange varieties constituted half or more of the orange tree movement — Temple included — in 10 of the 31 seasons. These seasons were 10 of the 12 most recent seasons, 1947-59. Thirty-seven percent of the 1958-59 movement of orange trees was late varieties. Of the three groups of orange varieties — early midseason and late — late varieties led in 26 of the 31 seasons which included the 21 most recent seasons, 1938-59. Early varieties led in the three seasons of 1935-38, and midseason led in 1929-30 and 1933-34.

There were 18 seasons when late varieties made up in excess of 40 percent of orange varieties. During the 1949-58 period, late varieties made up 55 percent of the orange tree movement and 46 percent for the 31 seasons. Valencia was the chief orange variety over the period, Hamlin second, Pineapple third, Temple fourth, and Parson Brown fifth. In 1958-59 the order by variety was Valencia, Hamlin, Pineapple, Parson Brown, Temple and Navels.

Movement of midseason orange varieties — Temple included — was second in importance with 30 percent of the orange tree movement in 1958-59, 34 percent in 1950-55 and 31 percent for the 31 seasons. The three leading varieties of this group were Pineapple, Temple and Navels.

The movement of early varieties made up 33 percent of all orange trees in 1958-59, 10 percent of 1950-55 and 23 percent for the 31 seasons. The early group consisted chiefly of Hamlin and Parson Brown with the former variety averaging more than twice the latter. Early varieties have been decreasing in importance of nursery stock movement since 1945-46. Hamlin movement exceeded Parson Brown during the past six seasons and averaged 289 percent of the Parson Brown movement during the 31 seasons. In 1958-59 the Hamlin movement was 799 percent of Parson Brown.

In 1958-59 the movement of all orange trees – Temple included – with 2,243,740 trees moved was the largest of the 31 seasons, 534 percent of average and 219 percent of 1950-55. The movement into Orange County was 502,253 trees in 1958-59 or 22 percent of the total orange tree movement. During each of the four seasons of 1951-55, Orange County led. Lake County was second in 1958-59, with 18 percent, Polk third with 17 percent, Hillsborough fourth with 10 percent, and Hardee fifth with 7 percent. Seventy-four percent of the orange trees were moved into these five counties.

Twenty-six percent of the early orange varieties were moved into Lake County with 197,446 trees, and stood first. Orange was second, Polk third, and Hillsborough fourth. Seventy-seven percent of these varieties went into these four counties. Lake, Marion, Seminole, and Volusia received more early orange trees than midseason or late varieties.

Twenty-four percent of midseason varieties were moved into Orange County with 162,150 trees and stood first. Polk was second, Lake third, Hardee fourth, Hillsborough fifth, and Hernando sixth. Seventy-eight percent of these varieties went into these six counties. Orange, Polk, Har-

(Continued on page 18)

For higher yields of bright, clean, quality fruit spray with Du Pont PARZATE® C

ZINEB FUNGICIDE

Bright, clean fruit and healthy foliage are the payoff when you spray with Du Pont "Parzate" C zineb fungicide. "Parzate" C is a wettable powder developed especially for use in Florida citrus groves. It controls both fruit russeting and greasy spot on oranges and grapefruit, resulting in disease-free foliage, which means better new growth and higher yields.

Experimental data and commercial usage show that "Parzate" C may be mixed with oil and parathion for reduced spraying costs. "Parzate" C is neutral in action, which means no harmful effect on soil pH, and you reduce equipment wear, too, because there's less material for pumps and nozzles.

For control of fruit russeting due to rust mites, use "Parzate" C at the rate of ½ pound per 100 gallons of water. Begin spraying when 10% of the leaves are infested with rust mites. For greasy-spot control, use "Parzate" C at the rate of 1 pound per 100 gallons of water.

"Parzate" C can help you produce more and better-quality fruit. Get the best in disease protection—order Du Pont "Parzate" C zineb fungicide from your dealer today.

For control of anthracnose and scab... Use Du Pont "Fermate" ferbam fungicide on nursery stock and trees not bearing fruit.

On all chemicals, always follow label instructions and warnings carefully.

DU PONT
REG. U. S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

PARZATE® C
ZINEB FUNGICIDE

Citrus Tree Movement Highest Ever

(Continued from page 16)

dee and Hernando received more midseason varieties than early or late.

Twenty-two percent of the late varieties were moved into Orange County with 182,043 trees and stood first. Lake was second, Polk third, Hillsborough fourth, Hardee fifth and Pasco sixth. Seventy-six percent of late varieties went into these six counties. Thirty-seven percent or 824,143 trees were late and these varieties led in movement into 10 of the top 20 counties.

Valencia trees led all orange varieties in each of the past 20 seasons and constituted 36 percent of the movement in 1958-59. Hamlin was second at 30 percent, Pineapple third at 22 percent, Parson Brown fourth at 4 percent, Temple fifth at 3 percent and Lue Gim Gong sixth at 1 percent. These six varieties made up 96 percent of the orange tree movement. Some other varieties in order of movement were Queen, Summerfield Navel, and Delicious.

Tangerine Trees.

Tangerine tree movement in 1958-59 at 34,685 trees was the highest movement since 1929-30. The 1958-59 movement was 184 percent of the 5-year average and 201 percent of the 31-year average. Saint Lucie led in 1958-59 with 10,199 trees. Polk was second, Seminole third, Orange fourth, Lake fifth and Volusia sixth. Eighty percent of the tangerine tree movement was into these six counties. Murcott Honey or Smith tangerine movement — not included in the above figures — amounted to 92,501 trees in Florida in 1958-59. This was 225 percent of the movement the previous season.

Grapefruit Trees.

Grapefruit tree movement was the highest since 1953-54. There were 102,613 trees moved this season which was 63 percent of average and 50 percent of the annual movement during 1950-55. For the second time in 14 seasons, the movement of Marsh Seedless trees exceeded red and pink varieties. Marsh movement at 73,790 trees made up 72 percent of total grapefruit. Red and pink varieties with 17,246 trees were second and made up 17 percent of the total.

Polk County received more grapefruit trees than any other county in 1958-59 with 22 percent of the movement. Indian River was second, Lake third, Saint Lucie fourth, Hillsborough fifth, Orange sixth and Pinellas seventh. Eighty-three percent of the movement was into these seven counties. Thirty-three percent of the movement was into three counties of the Indian River section — Indian River, Saint Lucie, and Brevard. All major citrus counties received more orange than grapefruit trees. For the state as a whole, there were 22 orange trees moved to each grapefruit tree.

Lemon Trees.

The movement of lemon trees in 1958-59 at 29,762 ranked fourth in these records. This amount was 47 percent of the movement during 1954-55. The Avon variety led in movement at 15,264 trees or 51 percent of the movement in 1958-59. Other important varieties were Meyer and Sicily. Thirty-three percent of the lemon movement was into Highlands County. Sarasota was second, Brevard third, Polk fourth and De Soto fifth. Ninety-one percent of the movement was into these five counties.

Lime Trees.

The movement of lime trees at 39,722 in 1958-59 was the highest since 1954-55. This movement in 1958-59 was 133 percent of that for lemon trees. Tahiti lime trees made up 30 percent of the movement. Hillsborough County led by receiving 37 percent of the lime trees. Dade was second with 8,601 trees. Polk was third, Broward fourth and Orange fifth. Ninety-one percent of the movement was into these five counties.

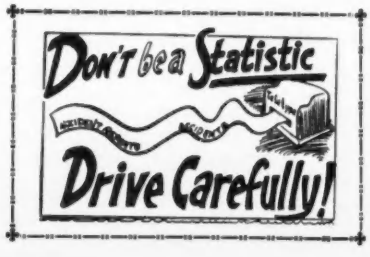
Tangelo Trees.

Tangelo tree movement in 1958-59 with 51,165 trees was first in the seasons of these records. The Orlando remained the chief variety moved at 76 percent. Lake County received the most trees at 37 percent of the total moved. Orange was second, Hillsborough third, Manatee fourth, Seminole fifth, Polk sixth and Brevard seventh. Eighty-five percent of the movement was into these seven counties.

MOVEMENT OF CITRUS TREES FROM FLORIDA NURSERIES TO FLORIDA DESTINATIONS*

Kind of Citrus	1928-59 Average	1928-59 Percent	1950-55 Average	1950-55 Percent	1957-58 Trees	1957-58 Percent	1958-59 Trees	1958-59 Percent
All Citrus								
Oranges	765,685	68.9	954,504	67.3	855,495	78.9	2,181,893	83.4
Temple	51,202	4.6	67,836	4.8	47,445	4.4	61,847	2.4
Grapefruit	164,109	14.8	206,166	14.6	37,357	3.4	102,613	3.9
Tangerines	17,289	1.6	18,887	1.3	12,118	1.1	34,685	1.3
Other Mandarins	33,716	3.0	45,136	3.2	51,292	4.7	101,412	3.9
Limes	34,751	3.1	47,390	3.4	21,387	2.0	39,722	1.5
Lemons	12,578	1.1	23,051	1.6	18,736	1.7	29,762	1.1
Tangelos	15,121	1.4	31,818	2.2	32,604	3.0	51,165	2.0
Other Citrus	16,595	1.5	22,758	1.6	9,027	0.8	12,122	0.5
Total	1,111,046	100.0	1,417,546	100.0	1,085,461	100.0	2,615,221	100.0
Oranges — Including Temple								
Valencia	334,109	40.9	539,117	52.7	399,811	44.3	803,576	35.8
Pineapple	125,460	15.3	215,584	21.1	186,948	20.7	499,318	22.3
Hamlin	138,848	17.0	53,279	5.2	187,454	20.8	667,198	29.7
Navels	21,264	2.6	37,886	3.7	9,388	1.0	38,890	1.7
Parson Brown	48,040	5.9	50,212	4.9	30,464	3.4	83,510	3.7
Temple	51,202	6.3	67,836	6.6	47,445	5.3	61,847	2.8
Lue Gim Gong	27,167	3.3	14,906	1.5	22,836	2.5	19,495	0.9
Pope Summer	11,119	1.4	14,875	1.5	2,050	0.2	889	**
Other Oranges	59,678	7.3	28,645	2.8	16,544	1.8	69,017	3.1
Total	816,887	100.0	1,022,340	100.0	902,940	100.0	2,243,740	100.0
Grapefruit								
Marsh Seedless	51,685	31.5	31,506	15.3	20,975	56.2	73,790	71.9
Thompson	31,754	19.4	52,525	25.5	1,935	5.2	3,024	3.0
Foster	8,726	5.3	2,785	1.3	2,206	5.9	1,732	1.7
Other Red and Pink	30,705	18.7	103,801	50.3	7,175	19.2	12,490	12.2
Duncan	13,956	8.5	10,075	4.9	3,339	8.9	9,806	9.6
Conners Prolific	3,703	2.3	341	0.2	3	**	31	**
Wateds	506	0.3	3	**	5	**	4	**
McCarty	1,988	1.2	178	0.1	10	**	8	**
Excelsior	3,943	2.4	678	0.3	2	**	239	0.2
Davis Seedless	364	0.2	380	0.2	186	0.5	214	0.2
Other Grapefruit	16,779	10.2	3,894	1.9	1,521	4.1	1,275	1.2
Total	164,109	100.0	206,166	100.0	37,357	100.0	102,613	100.0
Limes								
Persian	21,949	63.2	36,292	76.6	5,541	25.9	12,019	30.3
Idemor	1,512	4.4	242	0.5	-	-	-	-
Other Limes	11,291	32.4	10,856	22.9	15,846	74.1	27,703	69.7
Total	34,752	100.0	47,390	100.0	21,387	100.0	39,722	100.0
Lemons								
Villafranca	564	4.5	591	2.6	5,083	27.1	822	2.8
Perrine	2,321	18.5	7	**	-	-	-	-
Meyer	2,915	23.2	5,810	25.2	4,444	23.7	6,025	20.2
Ponderosa	529	4.2	1,196	5.2	702	3.8	784	2.6
Other Lemons	6,249	49.6	15,447	67.0	8,507	45.4	22,131	74.4
Total	12,578	100.0	23,051	100.0	18,736	100.0	29,762	100.0

* Fiscal Year of July 1 through June 30
** Less than 0.05 percent



SUL-PO-MAG in your mixed fertilizer protects tree health and yields with magnesium

Chances are your citrus soil is magnesium-poor. Most grove soil is. Sometimes the shortage is obvious: leaves show yellow . . . new wood lacks strength to fight off cold snaps . . . crops fall way below par. But often magnesium shortage signs are more subtle — year after year you just don't get the fine, healthy, high yields your trees are capable of producing.

Best way to be sure of high-income citrus crops is to build up available magnesium . . . by applying mixed fertilizer containing Sul-Po-Mag.

Products for Growth*

IMC

*Trademark

Sul-Po-Mag is granular and water-soluble. It dissolves slowly, stays available month after month. And Sul-Po-Mag (unlike some sources) does not leach out quickly. Sul-Po-Mag acts fast too. Doesn't have to wait for acids from roots and soils to make it available.

Protect tree health and promote high citrus yields. Start now with mixed fertilizer containing Sul-Po-Mag, the granular, quickly available magnesium source. Ask for it by name: *Sul-Po-Mag* in your mixed fertilizer.

S·P·M PREMIUM

Quality fertilizer containing a combination of readily available magnesium and sulphate of potash obtained from *Sul·Po·Mag*

Look for this identifying Seal of Approval when you buy. It's your assurance of extra-value fertilizer.

INTERNATIONAL MINERALS & CHEMICAL CORP.
Dept. CI-79, Skokie, Illinois
Please send me a free copy of your "Magnesium" Booklet which discusses magnesium and Sul-Po-Mag for specific crops.

NAME.....

ROUTE.....

TOWN..... STATE.....

79-59

AGRICULTURAL CHEMICALS DIVISION

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

Administrative Center: Skokie, Illinois

About Half Of This Season's Oranges Have Been Used

More than forty-three and a half million boxes of Florida oranges have been used in various marketing channels so far this season, Robert W. Rutledge, Florida Citrus Mutual general manager, said today. This represents 47 percent of the entire estimated Florida orange crop.

Florida's frozen concentrate plants have processed from 23 million boxes of oranges in packing 32,800,000 gallons of concentrate through early February, Rutledge said.

"This is about four million boxes more oranges used for concentrate than last season to date due to the earlier maturing of oranges this season," he said.

Oranges used in concentrate have yielded an average of 1.43 gallons of concentrate per 90-pound box of oranges, with practically all oranges used so far for this product being early and midseason varieties," Rutledge said.

To date, about 18 million boxes of grapefruit have been utilized this season, he said.

"According to the current USDA crop estimate we have 14 million boxes of grapefruit less to be harvested than at the same date last season."

1960 Better Fruit Program Now Being Distributed

The 1960 Better Fruit Program Spray and Dust Schedule, published annually by the Florida Citrus Commission, is now being distributed throughout the State.

Based on information furnished by the Florida Citrus Experiment Station, Agricultural Extension Service, State Plant Board, Florida State Horticultural Society and various federal agencies, the spray and dust schedule provides information concerning the control of tree diseases as well as spray formulas and chemical components.

The schedule, made up in the form of an 11-page booklet, is available at no cost through County Agents, Vocational Agriculture Teachers, and fertilizer and insecticide dealers throughout Florida.

Schedules may also be obtained by writing direct to the Florida Citrus Commission, Lakeland, Florida.

Statement of In-Place Treatments of Trees Affected With Spreading Decline

By Dr. Herman J. Reitz

FLORIDA CITRUS EXPERIMENT STATION

JANUARY 29, 1960

The Citrus Experiment Station has since 1945 conducted an intensive research program to discover methods for bringing about the recovery of trees affected by spreading decline. In 1959 one of the many approaches being tried by Dr. R. F. Suit began to yield promising results. The Citrus Experiment Station would not ordinarily release information based on the very limited number of trials conducted and the amount of data collected so far on the treatments. However, due to intense public interest in all developments in this area of spreading decline research, and due to apprehension that failure to give a factual statement might condone the spread of exaggerated or otherwise erroneous information, and in the interest of keeping all affected parties equally well informed, this statement is being released.

The technique that now appears to have some promise is based on a theory that short-term but intensive treatments of infested trees with relatively non-phytotoxic nematocides might so alter the balance in the soil between roots and parasites as to allow tree recovery from decline. Greenhouse treatments supported this theory before work was initiated in spreading decline affected groves.

Specifically, the most promising treatment now known consists of three applications at four-week intervals of 1,2-dibromo-3-chloropropane at four gallons of technical material per acre each. The nematocide is emulsified and applied through ordinary sprinkle irrigation lines.

The first treatment of this type was made in May 1959 to seven-year-old, decline affected, orange trees. By July 1959 there was a readily observable improvement in the appearance of the trees. The burrowing nematode population was reduced to very low numbers **but not eradicated.** So far as is known, this is the first time that spreading decline symptoms have been alleviated in the grove by chemical treatment.

Growers are cautioned against considering the above statement an endorsement of the treatment described or a recommendation for its use, and against other unwarranted conclusions from this study, for the following reasons:

Only a very few groves have been treated in this manner, so that the proportion of success in groves treated by this method is not known. The duration of the improved tree condition is not known. Optimum times and rates of application are not known. Differences due to tree age, variety, and soil type are not known, nor are numerous other essential factors. Even the chemical used may not be best for the purpose.

Further, the cost of a series of three treatments is approximately $400 per acre at present.

Finally, there is no U.S.D.A. label approval for use of 1,2-dibromo-3-chloropropane on citrus nor is there an F.D.A.-approved residue tolerance or ruling at this time. Consequently, fruit shipments bearing residues of this chemical would be subject to seizure by duly authorized agents of the Federal and State governments.

Therefore growers would be well advised to allow time for further research before seriously considering use of the treatment described in this statement in their own properties.

Research on the problem of treating spreading decline affected trees will continue at the Citrus Experiment Station with as much speed as possible.

Winston Retires After 40 Years USDA Service

John R. Winston, a senior horticulturist of the U. S. Department of Agriculture at Orlando, Fla., widely recognized for his work on citrus disease control and degreening and on post-harvest disease problems of citrus and vegetables, has retired after 40 years of federal service.

Winston joined USDA in 1916, and outside of four years in commercial work has been with USDA in Florida. Since 1953, he has been with the Agricultural Marketing Service's research laboratory at Orlando, which conducts research in the post-harvest handling, transportation, and disease of citrus, vegetables, and subtropical fruits, and in the storage, physiology, maturity, and quality evaluation of citrus. Prior to the organization of AMS he was with USDA's Agricultural Research Administration and the Bureau of Plant Industry in Florida.

JOHN R. WINSTON

Winston's early work was primarily with citrus diseases in the grove, during which he developed methods for the control of melanose and stemend rot. These methods consisted of spraying, pruning dead wood from trees, and disbuttoning fruit by treatment with ethylene gas.

One of Winston's main early contributions to the Florida citrus industry was in degreening fruit. Through his work and efforts, packinghouse operators designed and used controlled temperature and humidity rooms with forced air circulation and the trickle ethylene system. For developing this method, USDA through Winston obtained a public patent in the early 1930's, which made the method available to the entire industry. The newer method brought about a more uniform coloring of the fruit, and with less exposure to high degreening temperatures resulted in less injury and decay of the fruit. Also, it eliminated the fire hazard that was prevalent in earlier degreening methods.

Since 1929, Winston devoted most of his attention to post-harvest handling, shipping, storage, and market disease problems of citrus and vegetables. He also conducted extensive chemical screening tests to find more effective fungicdes for the control of decay in market produce.

In recent years, Winston made more than a thousand rail and truck shipping tests of fruits and vegetables from Florida. These tests produced valuable information on load temperatures during transit under different conditions, which made it possible to establish schedules for the use of economical and beneficial protective services for fruit and vegetable shipping.

Winston has written more than 100 technical publications covering the results of his research work. These include: A Method of Harvesting Grapefruit to Retard Stem-end Rot (USDA Circular 396); Citrus Melanose and Its Control (USDA Bul. 1474); Citrus Scab: Its Cause and Control (USDA Bul. 1114); Market Diseases of Fruits and Vegetables: Citrus and Other Subtropical Fruits (USDA Misc. Pub. 498); The Coloring or De-Greening of Mature Citrus Fruits with Ethylene (USDA Circ. 961); Cross-wise Loading of Long-type Watermelons (Marketing Research Report 133); and Export Shipping Tests to Europe with Florida Citrus Fruit (Marketing Research Report 321).

In 1954, Secretary of Agriculture Ezra Taft Benson presented Winston a superior service award for "notable research accomplishments which have made it possible to reduce the losses of citrus fruits during shipments, storage, and marketing and improve the quality of fruit marketed." In 1957, the Florida Fruit and Vegetable Association gave him an award for his research on the best methods of shipping vegetables. He is a fellow of the American Society for the Advancement of Science, and a member of many other scientific and professional organizations.

Winston was born at Hanover, Va., and was graduated in 1911 from Virginia Polytechnic Institute with a BS degree in agriculture. A year later he received a MS degree in plant pathology from Pennsylvania State University. After working a year in North Carolina and two years in Oregon, he spent a year in further study at the University of Wisconsin.

H. J. GRADY ELECTED PRESIDENT OF CALIFORNIA SPRAY-CHEMICAL CORP.

Howard J. Grady was named President of California Spray-Chemical Corporation today following the retirement on February 1 of Mr. A. W. Mohr, President for the past 13 years. Mr. Grady also becomes President of Ortho Agricultural Chemicals Limited of Canada. California Spray-Chemical Corporation is the manufacturer of the Ortho line of insecticides, fungicides, fertilizers and weed killers.

THE CITRUS INDUSTRY ADVERTISING PAYS DIVIDENDS

SUPERIOR
FERTILIZER AND CHEMICAL COMPANY
FERTILIZERS AND INSECTICIDES THAT ARE SUPERIOR
Factories and Offices: TAMPA and FORT PIERCE, FLORIDA

Future Farmers of USA Will Visit California's Golden Gate In August

Future Farmers all over America, with the goal a never-to-be forgotton trip to the world-renowned Golden Gate and the beautiful Berkeley Campus of the University of California, soon will be directing their energies and skill toward winning part of $2000 in travel funds offered by the American Institute of Cooperation in a joint educational project with the Future Farmers of America.

"Four FFA Chapters, one from each of four regions established by the U. S. Office of Education, will be selected in July to send their officers and adult advisor to the 32nd A.I.C. Summer Session on Farm Business at the University of California, Berkeley, August 7-10," according to J. K. Stern, President.

"Farm boys throughout the country gain first-hand knowledge and experience in how to conduct farm business, and make a satisfying career out of farming, through a learn-by-doing program," Mr. Stern said.

"Objective of this annual FFA national contest on Leadership in Cooperative Activities is to increase Future Farmers' understanding of, and participation in farm business activities of a cooperative nature. The contest gives deserved recognition to the best FFA Chapter program in each state and then to regional winners, who divide $2000 in travel funds and participate in the youth part of the unique annual A.I.C. Farm Business Conference. Last year, some 1500 rural youth and young farmers attended the annual meeting at the University of Illinois.

"State champion awards were presented to 24 FFA Chapters which won state contests last year. Last year's regional winners were: South Dade Chapter, Homestead, Fla.; Hamilton Chapter, Hamilton, N. Y.; South Cache Chapter, Hyrum, Utah; and Greenwood Chapter, Greenwood, Wis.

"The Institute, as the national educational and research agency for farmer cooperatives, will again present attractive award certificates to each state winner certified by the State Supervisor of Vocational Agriculture or state FFA officials. In addition to sharing in the $2000 cash awards, the regional winners will receive plaques. All awards will be presented during the "Youth Reports" session at the University of California, Monday, August 8, 1960, before an audience of some 3000 farm business and educational leaders, including 1500 farm youth.

"Thousand-word statements with photos and supporting evidence of their cooperative activities following the outline approved by A.I.C.-FFA officials, are to be sent by state-winning Chapters to Howard McClarren, A:I.C. Director of Youth Education, by June 30. Winners will be announced by July 15."

Saint Leo — Johnny Brown, driver for Florida Citrus Carriers, picks up bill of lading from Brother Oblate Jack Gorham, O.S.B., as Brother Thomas McDevitt, O.S.B., watches the transaction. Johnny is headed north with Christmas greeting from Florida and a truck load of Florida sunshine.

IRRIGATION SYSTEMS SHOULD FIT SPECIFIC AREAS, SAYS CHOATE

Gainesville, Fla. — Irrigation installations should be planned to fit the area and each should be analyzed separately, according to R. E. Choate, agricultural engineer with the Florida Agricultural Experiment Station.

He says each supplemental irrigation installation presents many variable factors and conditions, so it is impractical to base final decisions on average benefit and cost figures.

The type of system to install depends on such factors as topography, soil profile and land use of the area to be irrigated. Sprinkler systems are definitely called for on areas of rolling and hilly topography, says the engineer.

Surface systems, for level and uniform areas underlaid by a naturally high water table, have limited use in Florida.

Many versions of the sprinkler system may be installed. These include permanent installations as well as fairly portable systems or combinations.

"One big advantage offered through the portable systems," says Choate, "is that it permits fairly large areas to be irrigated at lower initial cost than with permanent installation." He adds that labor costs are usually higher for the portable system.

"A point that cannot be overemphasized," warns the engineer, "is that each irrigation application must contain the correct amount of water." Excessive applications will percolate into deeper zones and will not be available to plants. If a smaller amount is applied, lower roots will not receive moisture and consequently plant growth rate will be retarded.

Choate says the correctly planned supplemental irrigation system must be a coordinated system within itself. He recommends soliciting technical assistance from local dealers, engineering firms, state and federal agencies.

NOW!

TEDION® MITICIDE

approved for use on bearing citrus trees

Gives outstanding control of Citrus Red Mites, Six-Spotted Mites and Texas Citrus Mites

Here is good news for citrus growers! Tedion, the miticide that has time after time proved to be the outstanding control for citrus red mites, six-spotted mites and Texas citrus mites, is now approved for use on bearing trees. You can apply Tedion to oranges, grapefruit, tangerines, tangelos, limes, and citrus citron while fruit is on the tree. Tedion can also be used on lemon trees, but only while no fruit is present.

Now—Apply Any Time During Season

The new approval for Tedion on Citrus means that you now have available a superior miticide that can be applied at any time during the fruiting season. Use only one application after fruit begins to form. On non bearing trees there is no restriction.

Most Effective Miticide Available

Several years of testing have shown that Tedion is the most effective miticide available for several reasons:

• **Long Lasting Control** – Tedion is extremely long-lasting in its effectiveness as a mite control. Repeated sprays are not necessary. You get better fruit production; greater economy in growing your crop.

• **Low Toxicity** – Tedion has a very low order of toxicity—it is safe to the spray-operator and grove workers, and non toxic to fruit and foliage. Tedion lets your trees grow properly without spray damage.

• **Harmless to Beneficial Insects** – Tedion is non harmful to bees and other beneficial insects—it kills *only* mites.

Technical Chemicals Department,
Niagara Chemical Division,
Food Machinery and Chemical Corp.
Middleport, N. Y.

Tedion

Tedion is available from CALIFORNIA SPRAY CHEMICAL CORPORATION • GENERAL CHEMICAL DIVISION • NIAGARA CHEMICAL DIVISION • STAUFFER CHEMICAL COMPANY and their dealers.

Citrus Fruit In Europe

Last week Florida Citrus Mutual went all out with their forecast "What's next?" for the balance of the 1959-60 season for Valencia oranges.

I thought it might be interesting for you growers to know what is going on in Europe. The U. S. Department of Agriculture on January 15, 1960 issued the following information regarding the supplies of citrus fruit available for European markets:

The Mediterranean orange and tangerine crop which will be marketed November 1959 through June 1960 is estimated at 123 million boxes, compared with 110 million boxes in 1958 and 101 million boxes in 1957. The most important increase in competitive supplies will be in fruit from Spain and Israel.

Total exports from Mediterranean producing areas to Eastern and Western Europe are estimated at 66 million boxes, compared with 56 million boxes last season. A reduction in Europe's 1959 deciduous fruit crop will give Mediterranean orange producers an advantage in selling their larger winter supplies.

Israel reports a smaller Shamouti orange crop on older trees but increased production of large, rough-peeled fruit on groves coming into production. The Valencia orange crop is expected to be larger than last year. Total Israeli exports are estimated at about ½ million boxes larger than the 1958-59 season.

Israel expects the West German market to take over 800,000 boxes of Shamouti oranges, 300,000 boxes of Valencias, and about ¼ million boxes of grapefruit. Half the grapefruit and 75 percent of the oranges will be sold on consignment. However, about half of Israel's total citrus exports will continue to be sold in the United Kingdom.

Israel has changed methods of handling fruit in packing houses in an effort to eliminate the heavy decay which affected last year's exports. Also, the Israeli Marketing Board is conducting a major program to control the Mediterranean fruit fly. Israeli exporters receive favorable exchange rates. The official rate of exchange is 1.8 Israeli pounds to the dollar. In 1959, citrus exporters received 2.16 pounds for the dollar, and they are requesting 2.65 pounds to the dollar this season.

Spain's citrus crop is its largest in the last 6 years. The quality of fruit is excellent, although some damage by fruit fly was reported in November exports to Europe. Factors favoring larger exports this year include a new exchange rate of 60 pesetas to the dollar, compared with 42 pesetas last season. Selling prices are also reported lower than a year ago.

Algeria reports a much larger crop, but some groves are said to be poorly cared for because of the uncertain political situation. The subsidy in effect last season will again be continued. Orange exports to France are taxed 10 francs per kilo. The returns from this tax are used to pay a 15-franc-per-kilo subsidy on exports to non-French markets. This will probably increase Morocco's exports to the United Kingdom and West Germany.

Mexico's exports to Europe are not expected to exceed ½ million boxes, practically all of which were sold in Europe before Christmas.

Competing supplies of grapefruit from the Mediterranean and the West Indies are estimated at 5 million boxes, about ½ million boxes larger than last season.

Exports of competing grapefruit to Europe are expected to be about 2¼ million boxes, compared with 2 million boxes last year.

FFVA Representative Makes Good Will Trip To Mexico

A representative of the Florida Fruit & Vegetable Association traveled to Mexico recently carrying the greetings and good wishes of Governor Collins and the people of Florida to the people of the State of Sinaloa.

John S. Peters, manager of the Membership Division of FFVA, presented a scroll signed by Governor Collins to General Leyva Velazquez, Governor of Sinaloa.

The State of Sinaloa, like Florida, is a major producer of fresh winter vegetables and hosted the meeting under the asupices of the Royal Fruit & Produce Company and Tirbolet Associates to promote a better understanding between growers.

FOR A RICHER HARVEST, GET THE BEST!

Successful citrus growers know that it takes more than an ordinary fertilizer to keep a grove in the best of condition.

FLORIDA FAVORITE FERTILIZER specializes in the formulation of fertilizer mixtures geared to actual requirements of individual consumers . . . . For a richer Harvest get the best —

FLORIDA FAVORITE FERTILIZER.

COMPLETE FIELD SERVICE
- CITRUS GROVES
- FIELD CROPS
- PASTURE GRASS
- TRUCK FARMS

florida favorite fertilizer
INCORPORATED
PH. MUTUAL 2-2153 • P.O. BOX 912 • LAKELAND, FLA.

Write For Full Information

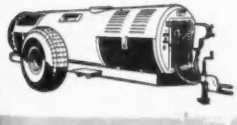
97,500

CUBIC FEET OF AIR PER MINUTE

THE HIGHEST LEVEL OF SPRAYER PERFORMANCE IN THE WORLD TODAY...

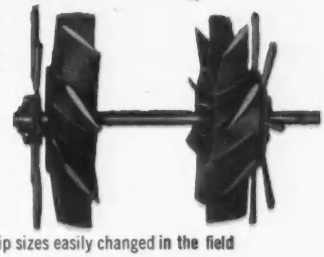
Measured by any standard—judged by any detail—this new Hardie Duo-Fan Model No. DF-800, two-fan sprayer is the greatest and most advanced sprayer ever built. Not only is it a bigger sprayer than ever before available, but each and every part right down to the nozzle tips saves time, labor and cuts maintenance cost to the vanishing point. It simply is bigger and stronger than any spray job.

What other sprayer permits you to adjust nozzles, even change tips, easily and quickly in the field, spray largest trees on BOTH sides of the row and meet the most gruelling tests with more than ample capacity and power? Growers everywhere, regardless of acreage, will thrill to the performance of this great sprayer. It marks the beginning of a new era in pest control. There is a Hardie dealer near you. Ask him for a demonstration. Write for literature.



Hardie DF-520 includes the same advanced features as the DF-800, with over 62,500 cubic feet of air per minute.

ONLY HARDIE BRINGS YOU THESE PRICELESS ADVANCEMENTS

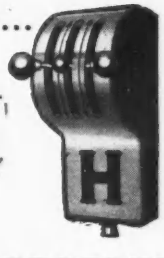


- Hardie patented two-fan assembly. Two, 40 inch axial flow fans mounted with blades opposed on a single shaft, delivering 97,500 CFM plus. Approximately 30% more air volume than a conventional single 40" fan. Covers more acres per hour than any other make of sprayer.
- 36 nozzles—18 on each side—for discharge on either or BOTH sides. Each nozzle can be easily and quickly adjusted **in the field** for any desired spray pattern. Nozzle tip sizes easily changed **in the field**
- Rugged, powerful 501 Cubic Inch Heavy Duty engine designed for long, sustained operation. 50 gallon oversize gasoline tank [runs all day without refilling]. L-P gas engine available
- New, big oil cooler—cuts oil cost.
- Long life, oversize, tube and fin radiator gives 15% to 20% more cooling.
- All-new stainless steel Hardie-Klad Tanks, stainless agitator shaft, stainless agitator paddles, stainless drive tube, all stainless interior piping.
- Transmission assembly of tremendous strength. Direct drive to fans.
- Fan bearings completely protected, easily lubricated.

AIRCRAFT TYPE REMOTE CONTROL

DEPENDABLE... PROVEN

Heavy duty construction, simple design, easy to operate. Controls throttle and spray delivery on one or both sides.



MANUFACTURERS OF:

Agricultural Sprayers

•

High Pressure Pumps

•

Dusters

Write today for illustrated literature. Use the coupon.

HARDIE
PEST CONTROL EQUIPMENT
• SOLD AND SERVICED AS OVER THE WORLD

The Hardie Manufacturing Company, Inc.
Dept. CI
Wilkes-Barre, Pa.
Please send me Duo-Fan Sprayer data.

NAME.....

ADDRESS.....

CITY.....STATE.....

SPRAYERS ARE OUR BUSINESS-OUR ONLY BUSINESS FOR OVER 65 YEARS

ADVERTISEMENT — LYONS FERTILIZER COMPANY

The LYONIZER

COMPILED BY THE LYONS FERTILIZER COMPANY

Reports Of Our Field Men . . .

WEST HILLSBOROUGH, PASCO AND PINELLAS COUNTIES

J. W. Boulware
Phone WEbster 8-2638
Tampa, Fla.

The groves in this section are in fine condition in general. The trees have wintered well, have excellent new growth and are showing a good bloom. They should set a heavy crop. It appears that we are now entering upon an excellent growing season.

The marketing of this year's crop has progressed in an orderly manner at fair and exceptionally stable prices. All indications point to a continuation of this uniform pattern to the conclusion of the picking season.

The Spring fertilization is just about completed. Now is the time to look to the post bloom spray if needed. If oil is to be used be sure to apply it before the fruit is as large as ½ inch in diameter. Call me if I can be of assistance.

SOUTH POLK, HIGHLANDS, HARDEE AND DeSOTO COUNTIES

C. R. Wingfield
Phone: Glendale 3-4537
Avon Park, Fla.

Biting cold winds and temperatures continue to plague vegetable and citrus growers. Never knowing what the next 24 hours will bring. Much damage has been done to vegetable crops but the grower replants in hopes for better growing conditions.

The citrus trees have been in a stage of blooming for over a month. If we have a few days of warm sunshine it will open and it looks at this time as if we will have a good bloom. However, there is one question we can ask ourselves, "Has the bloom bud been weakened to the extent it will not set a fruit?" Only time will answer this question. Many Valencia oranges have been moved because of the cold damage inflicted the latter part of January. Some undamaged Valencias are going into the fresh fruit market.

Top Dresser fertilizer applications are being applied to strengthen the bloom as much as possible. We hope with the passing of the full moon in February we will not have any more cold weather. Nonbearing trees are not being fed until it is safe to pull down the banks from around them.

SOUTH HILLSBOROUGH, MANATEE AND SARASOTA COUNTIES

Eaves Allison
P. O. Box 365, Sarasota, Fla.
Phone Fulton 8-2611

During the early part of February there was considerable citrus leaf drop and some fruit drop caused by the January freeze. Bloom signs of citrus were evident very early this year, but the main bloom is just now coming at what is considered the normal time — mid-February.

A good feature of this bloom is the new growth and bloom coming together. From past observation that would indicate a more uniform and heavier fruit set. Since it is easier to see in the process more optimism will prevail among the growers about the size of their prospective crop.

Vegetable growers were of course clobbered by the January freeze, losing most of their plantings and also many of their seed beds. On top of that they had a three and a half inch rain and another near freeze in early February. These last factors have taken their toll. — The young field crops of tomatoes, squash, etc. are spotty and hard looking but still trying to grow. In their struggle for survival that good Lyons Fertilizer is one of their main supports!

HIGHLANDS AND POLK COUNTIES

R. E. Lassiter, Jr. & R. S. Carlin
P. O. Box 1304
Winter Haven, Fla.

The Spring fertilizer application is well advanced at the time of this writing. Growers have been applying the Spring application earlier than usual this year due to the advanced stage of bloom. The rains during February have been very favorable and have encouraged this early growth.

Cold weather in the latter part of January has apparently had little effect on citrus. Pockets and colder areas have shown some foliage damage and some fruit damage has occurred.

Again we would like to stress the use of a nutritional spray, especially in areas hurt by cold, and in those groves showing minor element patterns. The outlook is for heavy Rust Mite build-up in March; consequently, growers should use Rust Mite control in the post-bloom application.

The young tree program should be started from the first to the fifteenth of March and continued throughout the Summer. The banks should be pulled down and the trees fertilized in the same operation.

NORTH CENTRAL FLORIDA

V. E. Bourland
Winter Garden, Fla.
Phone 107

We are having Spring and Winter weather; warm with showers, cold with Winter wind. Groves are looking good with growth, and lots of bloom coming. Most of mid-season fruit has been moved. Seedlings being picked now. Some Valencias moving, but slow.

Top Dresser being put on now, and most groves being worked. Spraying machines are ready to go.

Truck crops are still having a hard time. Growers are all busy putting out their Spring crop. Pastures are still brown from frost.

LYONS
FERTILIZERS
PRODUCE
MAXIMUM CROPS
OF
FINEST QUALITY

ADVERTISEMENT — LYONS FERTILIZER COMPANY

Uncle Bill Says:

They was a time once when if'n your dog got sick you jist let him alone to git well the best way he could . . . and folks had to be awful sick, back in the days before skilled surgeons 'n antibiotics 'n sich, for anyone thought of callin' the doctor . . . years ago, too, many a tooth was yanked out with a pair of pliers . . . while the business of takin' care of trees and crops was more or less limited to cultivatin' 'em . . . but all this has changed now days . . . they is specialists who kin remedy most every known ailment of human, animal and crop these days . . . or at least help 'em a lot, with the result that folks is livin' longer, animals git about as good treatment as folks, while crops is bigger 'n better than they ever was . . . times certainly do change and in a lot of ways the change is fer the better . . . we're sort of glad we are livin' today rather than back in the "good old days."

'Course all these modern services cost more than they used to . . . and while the effects of inflation is apparent in everything we buy and in every service we pay for . . . we're gittin' more fer everything we sell 'n most of us is livin' better than we ever did . . . livin' in better houses, drivin' better cars, sending our kids to better schools, 'n havin' to go on diets to keep down our weight . . . some folks is already figgerin' how they are going to operate their businesses or grow their crops on the Moon or on Mars or Saturn or Venus, but personally we'll take what we got without tryin' to figger out some new spot in outer space to set up our next place of business.

We ain't so much concerned these days about havin' a green thumb . . . we're more interested in keepin' informed about the newest and best methods of keepin' our crops and trees strong 'n healthy . . . and the best way we've found of doin' that is to use Lyons Fertilizers which always produce Maximum Crops of Finest Quality.

The Long-Time Citrus Outlook

(Continued from page 14)

Mrs. Consumer is in a preferred bargaining position — you cannot bargain with her. In order to get her business merchants, whoever they are, either have to give her what she wants or make her believe that she is getting what she wants. In order to do this ,merchants who cater to her have to not only give her: (1) one-stop shopping, with parking, air-conditioned stores, and ideal shopping arrangements but they also have to give her; (2) fair prices, (incidentally the consumer's conception of fair prices has no relation to the economists conception of fair prices);' (3) high and uniform quality product; and (4) all of these things at all times.

Because of the consumer's preferred bargaining position, she is able to demand these things. Therefore, whoever serves her will insist, on uniform quality and high quality and a schedule of delivery that suits the consumer. This puts the producer and the first handler, whether cooperative or private firm, in a weak position particularly under the present organization. Furthermore, as the industry is presently organized, it cannot do the best job in supplying the quality and delivery schedule wanted by buyers.

In the past, the owner of marketing facilities controlled the product as it moved to market. Today, ownership of the brand may be much more important than ownership of facilities. The ownership of a brand, which consumers demand and insist on having, is in a strong position to influence the pricing of the product to the consumer, the margins taken in the channels of trade, and the shelf space in a retail store. Because of Florida's unique position, she has a far better opportunity to establish producer brands for citrus than growers of most other products.

A different organization of the citrus industry from the standpoint of marketing aond the establishment of producer brands should not be entered into lightly. Too often, economic decisions are made without proper study. Too often, economic decisions of this kind are made by people not trained in economics. Furthermore, they are made without the proper re-

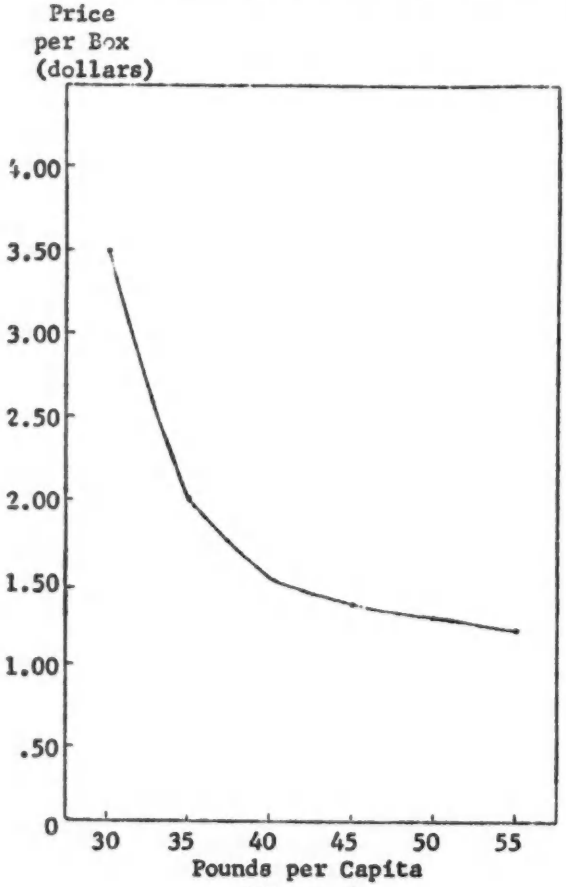


Figure 3.

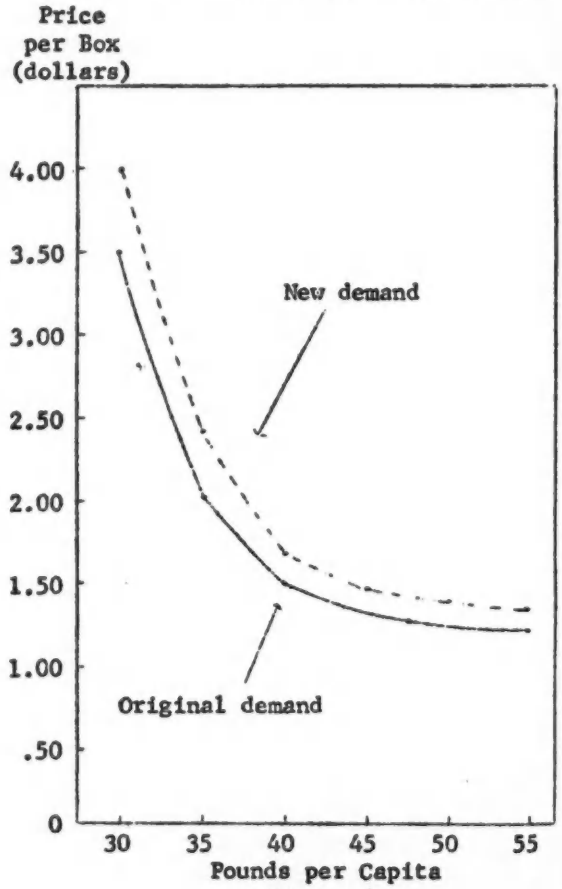


Figure 4.

Hypothetical demand curves for oranges, illustrating a change in demand, that might have been caused by, new uses, improved quality, decrease in demand for competing products or by advertising and promotion.

Figure 3 illustrates the situation without any changes. Figure 4 solid line is same as Figure 3 and broken line represents an increase in demand, because of changes in one or more of the above factors which may affect the demand for oranges.

search work in advance of the decision. I am perplexed by the way industry people are willing to make economic decisions with so little economic research. Economics is unique in that physical and biological scientists and lay people often speak with authority, but without knowledge in the field of economics. But these same people would not speak with authority in other disciplines in which they have no knowledge.

Market organization and producer brands for citrus are only two of many economic problems that the industry will increasingly be confronted with over the next 20 years. At sometime in the future, when the going gets tough, some people will pressure for government support prices. They will have many reasons, such as many other commodities have support prices, prices are below cost of production, growers are entitled to cost of production plus a profit. In the same way supply will adjust to an increase in demand, it will adjust to a decrease in demand and it can best do this under a free enterprise economy without government participation.

MELSHA NAMED PRESIDENT HARDIE MANUFACTURING CO.

Edward V. Melsha has been elected president of the Hardie Manufacturing Company Inc., Wilkes-Barre, Pennsylvania, manufacturers of agricultural sprayers and high pressure pumps. Mr. Melsha served as president of Vulcan Iron Works, also located in Wilkes-Barre, from 1950 to 1955; and previously, he was an executive of Johns-Manville Sales Corporation and other companies.

He was placed in charge of the Hardie operations in Hudson, Michigan, when the Hardie Company was acquired by Universal American Corporation of New York City in June of 1957. He also supervised the moving of the enterprise from that city to Wilkes-Barre, Pennsylvania, in July of 1958.

THE CITRUS INDUSTRY ADVERTISING PAYS DIVIDENDS

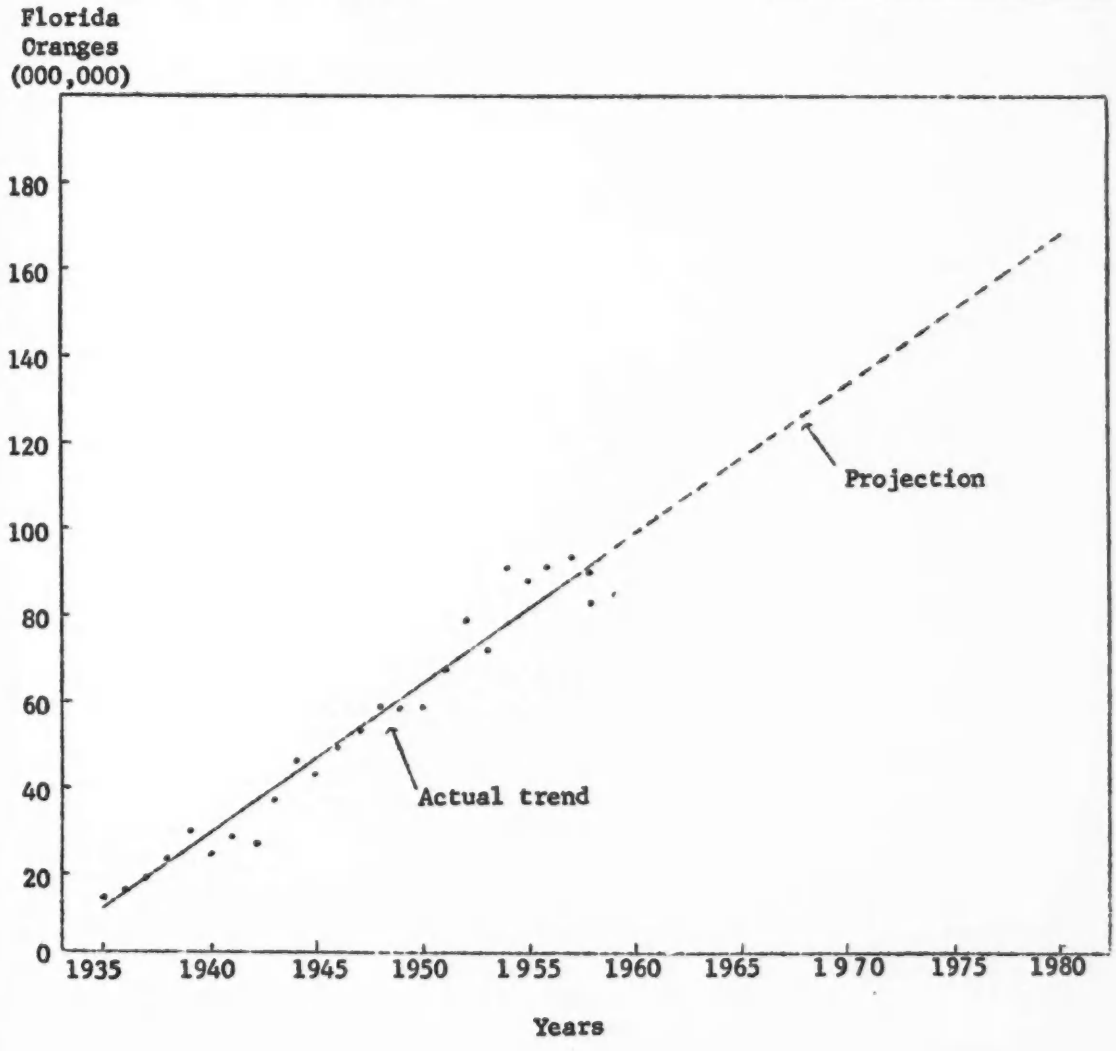


Figure 5.--Trend in Production of Florida Oranges 1934-35 Season to 1957-59 Season and Projection Based on Rate of Increase from 1934-35 to 1957-58. The increase was 3,483,000 boxes per year or 6.5 per cent.

EXTENSION AGENTS AID LARGE NUMBER FLORIDA FAMILIES

An estimated 448,000 Florida families were assisted by county agricultural and home demonstration agents during 1959, according to figures released by Dr. M. O. Watkins, director of the Florida Agricultural Extension Service.

Breaking this figure down, the director reported assistant to 44,000 farm families, 88,000 non-farm rural families, and 316,000 urban or city families.

The large increase, 73,000 since 1958, in assistance to city dwellers include families calling on home demonstration agents for help in homemaking problems.

These same urban families called on county agricultural agents for help with lawns, fruit trees, ornamental and numerous other subjects.

During the year, Extension Service workers used many different devices to complete their programs. Assistance was provided through 118,000 bulletins, 3000 office visits, and 374,000 telephone calls.

Work with young people through 4-H Clubs increased during 1959. The number of clubs in the state reached a total over 1700. Membership in these clubs totalled nearly 43,000.

Dr. Watkins reported that more 4-H Club members completed projects than ever before in the history of the state. Nearly 29,000 members submitted their final reports on their work for the year, covering more than 97,000 projects.

A big increase in Extension activities came in foods and nutrition, health, family life and safety. Nearly 104,000 families were helped in one or more of these.

Mr. CITRUS Grower

Are you looking for warmer land for your new grove? I have it.

Western Martin County, between Lake Okeechobee and the Atlantic Ocean, has had NO freeze in 20 years bad enough to damage citrus.

The old Bowers grove there is 60 years old, and still producing good. Bessemer Properties has 900 acres fine bearing groves at Port Mayaca, with heavy production, and fruit especially suitable for concentrate. Bessemer is now planting a large new grove east of Indiantown.

New growers in the area are Alcoma, Hood, and others, all now planting. Howard of Orlando has 1,000 acres of bearing trees, and planting more.

For LARGE GROWER, I can offer one large ranch, 9600 acres, with access to St. Lucie canal for irrigation and drainage. Much of it cleared and planted to improved pasture grasses. Completely diked, and largely dross ditched. Full water control in 60% of the land. Could be ready to plant citrus immediately. Good terms. $200 per acre.

Smaller growers can select from one section upward, from a 12,850 acre tract, with highway-railway frontage. $200 per acre. Terms.

Write or call for map and details. Land shown by appointment at your convenience. Principals only.

THURMOND W. KNIGHT
Realtor
Box R. B. 1422 — VI 8-6485, res. VI 8-2682
WEST PALM BEACH, FLORIDA

Classified Ads

NEW GROVE HEATERS — Approximately 1,500 California Short Stack Heaters available immediately at $4.50 each, F.O.B. Dade City, Fla. For further information ask for P. J. Hendrickson — PHONE DADE CITY, LOgan 7-5671 or write DADE CITY, P O. BOX 558.

CITRUS TREES—Quality Registered and Non-registered Citrus trees—Popular Varieties—Rough Lemon and Sour Orange Root Stocks—Complete Planting Service if needed. ADAMS CITRUS NURSERY, Winter Haven, CY 3-6075.

For Mechanical
HEDGING
of
CITRUS TREES
Call or Phone
Wm. W. LAWLESS
WINTER HAVEN
Phone CY 4-2113

SUPERIOR CITRUS TREES

Available now . . . .
Registered psorosis-free and regular budded stock grown on high virgin land, certified nematode-free. Protected by wind machines and fuel for assured delivery.

Will bud on order variety and rootstock of your choice for Spring 1961 delivery from registered psorosis-free and xyloporosis-free parents.

For quotations write, or call GLendale 2-7541. Will send Citrus Newsletter and price list on request.

WARD'S NURSERY, INC.
BOX 546 AVON PARK, FLA.
"Serving the Florida Citrus Industry Since 1924"

ADVERTISING IN THE CITRUS INDUSTRY PAYS BIG DIVIDENDS.

Hairy Indigo SEED
New Crop — High Purity and Germination
Early $25.00 CWT
Late $22.50 CWT
LEWIS & VICKERS
HAINES CITY, FLA.
Box 1117 Ph. HA 2-1877

GROVE PROBLEMS?
Consult Dr. Wolf to bring back and keep your grove in top condition. Phone or write for free details.
DR. WOLF'S LABS
2620 Taylor St.
HOLLYWOOD, FLORIDA
Phone: WA 2-2808

Hamlin, valencia, pineapple and temple oranges; orlando and mineola tangelos for spring or summer planting. Nemotode free. Prices on request. Crescent Farms, P. O. Box 890, Bradenton, Florida. Telephone 2-3821 or 2-7004.

BUDDING YOUR VARIETY OF CITRUS NOW for Summer and Fall of 1960 and Spring of 1961 delivery; REGISTERED psorosis and xyloporosis-free, or non-registered; on lemon, sweet, Cleopatra or sour stock. Limited quantity of trees still available for delivery now. Write for prices. GRAND ISLAND NURSERIES, Box 906, Eustis, Florida.

GENUINE PARTS
GUARANTEED SERVICE
POUNDS TRACTOR CO.
Your Case and Hardie Dealer
Two Locations:
3rd & Ave. "D" — S. W.
WINTER HAVEN
102 North Rest Ave.
AVON PARK

Perfect Citrus Profit Picture!

When you knock out Nematodes with D-D® or Nemagon®

SOIL FUMIGANTS

You can get bigger and better citrus yields when your trees are free of root damaging nematodes. And you can knock out those nematodes with D-D or Nemagon Soil Fumigants—help restore vigor to your citrus trees.

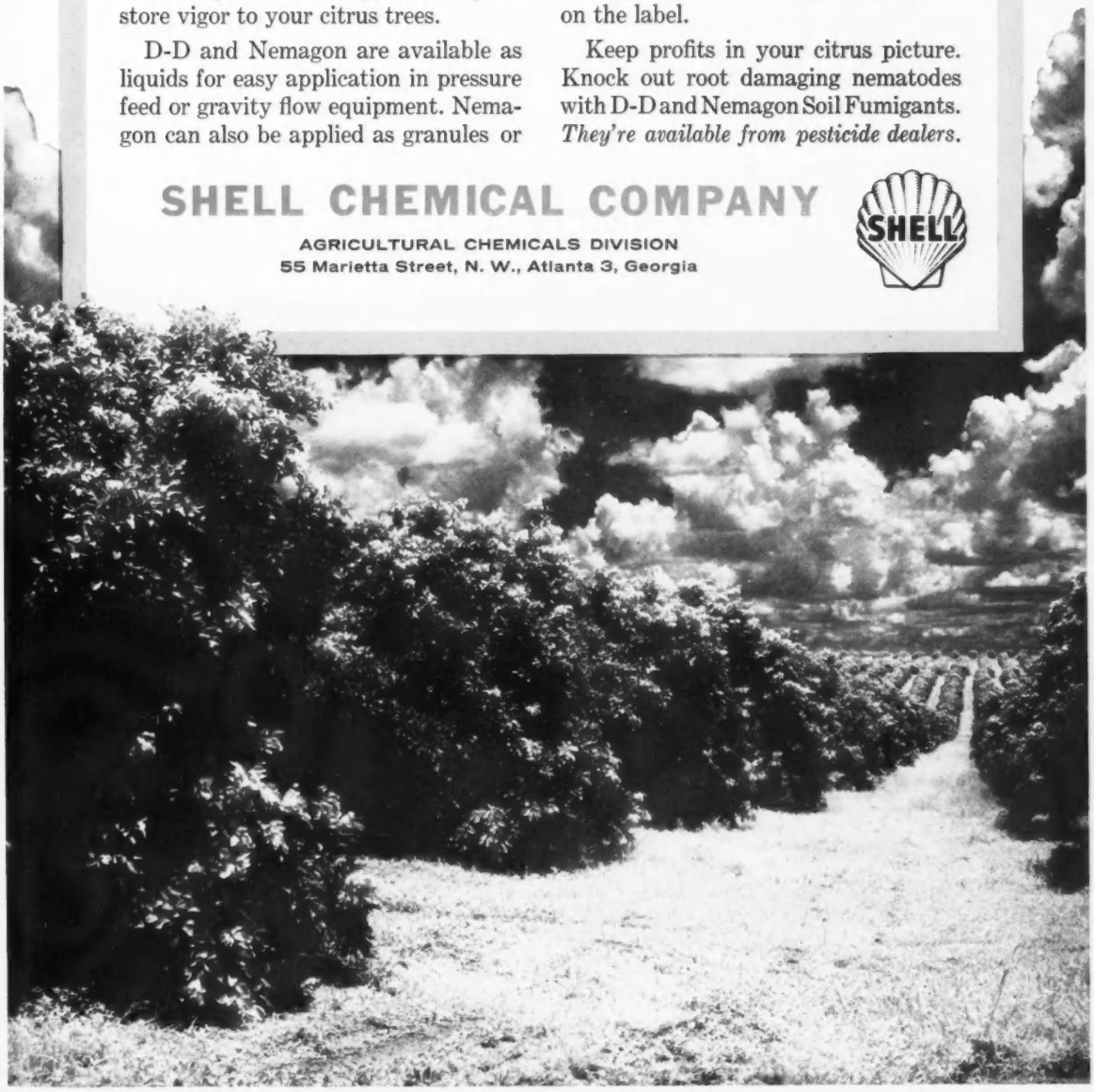
D-D and Nemagon are available as liquids for easy application in pressure feed or gravity flow equipment. Nemagon can also be applied as granules or mixed with fertilizer for one time-and labor-saving application. Once in the soil, D-D and Nemagon become potent gases, killing nematodes as they spread. For best results follow the instructions on the label.

Keep profits in your citrus picture. Knock out root damaging nematodes with D-D and Nemagon Soil Fumigants. *They're available from pesticide dealers.*

SHELL CHEMICAL COMPANY

AGRICULTURAL CHEMICALS DIVISION
55 Marietta Street, N. W., Atlanta 3, Georgia

SHELL



LYONS

FERTILIZERS

PRODUCE

LYONS FERTILIZER COMPANY

PHONE 43-101

TAMPA, FLORIDA